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FIFTEENTH ANNUAL REPORT
OF THE
PROVINCIAL BOARD OF HEALTH
OF ONTARIO
—
1896

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in the City of New York

College of Physicians and Surgeons

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FIFTEENTH ANNUAL REPORT
OF THE
PROVINCIAL BOARD OF HEALTH
OF ONTARIO
BEING FOR THE YEAR
1896.

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO.



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FIFTEENTH ANNUAL REPORT

OF THE

PROVINCIAL BOARD OF HEALTH.

To the Honorable GEORGE AIREY KIRKPATRICK, Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOR:

The Provincial Board of Health in presenting this its fifteenth annual report has pleasure in announcing to your Honour that though in some localities of the Province fatal infectious disease has prevailed during the year just past, yet throughout the country at large the health condition has been favourable.

The localities which have been exceptional to this general well-being have been for the most part outlying townships, where the sparseness and poverty of the population have rendered the adoption of measures of disease prevention difficult and in some instances impossible.

In the sections referred to, the most prevalent and fatal malady has been diphtheria. The prevalence of this affection in the communities which occupy such portions of the Province is not difficult to account for. Men and animals are usually closely congregated around the homes, and excrementitious matters are allowed gradually to accumulate, no thought is given to the danger of communication between infected and uninfected persons, and conditions are established which render the transmission of diphtheria easy, and its results sure. The kindly people regard it as not merely unkind but cruel to abstain from visiting their neighbors in distress, but it is hoped that through this report to your Excellency it may be apprehended by all, that in the conditions above adverted to, more than in any others, it is the part of true kindness, and of consideration for friends and neighbors, that no risk be run of carrying among them the infection of an ailment so destructive and distressing as diphtheria is too well known to be. Of its acute infectiousness no one can have any doubt.

During the latter half of the year an effort has been made to obtain a knowledge of the relative prevalence and fatality of four notable diseases—typhoid fever, diphtheria, scarlet fever and phthisis—The result of the investigation, so far, has been that phthisis, in its death roll has exceeded all the others put together by a large margin. As to the most feasible means of prevention against

this malady, there is a great want of uniformity of opinion. Isolation of the sick if it were possible would probably be the most servicable, and houses or hospitals for consumptives are being strongly advocated by some, but as strongly opposed by others, on the ground that isolation is insufficient to affect materially the prevalence of a malady so all pervading, and moreover that it is unnecessary, and also impracticable for the larger number of infected individuals or families.

This subject is thought to be fitly included here, as with it may be involved the need for considerable public expenditure.

Much of the time of the Board has been occupied with projects brought before it having reference to the cleanliness of various towns. On this matter inquiries have taken place affecting nine localities some of them places of importance, having large populations.

Attention has also been given to unorganised territories and to the sanitary state of lumber camps, and means discussed and devised for the protection of the health of those residing in the former, and of those employed in the latter.

The report of the Board contains reference to instances of rabies from dog bite, and to the provisions for aborting the evil.

Attention has also been given to the subject of school hygiene, as also to the dental inspection of the children it having been reported by experienced dentists that they have found the teeth of children generally to be in a state of incipient decay. The inspection proposed was commended as also the means of checking the decay when signs of it were found to exist.

There were also other reports from the various committees, eight in number, and all of importance to the well-being of the communities to the interests of which they referred.

To all, the Board gave its best attention, and adopted regarding them such measures as in each case seemed necessary.

Respectfully submitted,

J. D. MACDONALD,
Chairman.

PART I.

PART I.

CHAPTER I.

ANNUAL REPORT OF THE PROVINCIAL BOARD OF HEALTH.

REPORT OF THE SECRETARY.

This year marks the fifteenth year of the existence of the Provincial Board of Health of Ontario, and, following a brief reference to the public health of the province during 1896, it will be proper to indicate some of the advances which State medicine has made throughout the world, and it is believed in Ontario as well. Chapter V. will be found devoted to this latter subject.

The year 1896, has been marked in Ontario by an exceptional freedom from the presence of any of the communicable diseases dealt with under public health laws. Only one case of smallpox of a mild character was reported. Scarlet fever present in a number of localities to a limited degree was of a mild type, and as will be seen in the reports of the local boards of health contained in Part II. of this report caused but few deaths. Measles and whooping cough, were locally prevalent in a few districts, but were similarly mild in type. Diphtheria, the too prevalent disease in the northern portion of the American continent, has shown a marked decline, notably since 1893. Indeed it would appear that there are good grounds for the belief that the increased knowledge which physicians and the public have gained regarding this disease will result in a notable reduction, if not of the number of cases, at least in the number of deaths attributable to this cause.

La Grippe during 1896, was not present in epidemic form in the province, and the statistical returns give very few deaths stated to be due to this cause.

Typhoid fever, owing to the dry season in certain sections of the province, showed as usual in rural districts and those towns and villages not supplied generally with a public water supply, the same local prevalence which these atmospheric and telluric conditions have so long been observed to produce.

In Chapter II. some of the more evident relations of this disease to the conditions under which it exists will be considered.

The year must be regarded as an important one in the development of water works and sewerage systems, those works of public utility, which may be considered as being the most correct index of the progress of municipal sanitation. The reports of the committees of the board published in Part II. give the details of some of the more important works instituted during the year. As another index of the growth of municipal sanitation, the increased number of medical health officers, appointed at the beginning of 1897, may be referred to. Thus in 1896 there were 375 while in 1897, 549 have been reported. While it is true that the routine work of the local boards of health in the townships and smaller incorporated municipalities is often of a nominal character, yet the fact that the presence of contagious diseases can be dealt with either promptly or satisfactorily only by a medical man, is causing the local boards to urge their appointment with more effect from year to year. The more permanent character

of these local boards under the amendments of the Public Health Act passed in 1895 is likewise a factor in increasing the effectiveness of the work of these organizations.

To this may be added the increased facilities which the Act relating to the registration of deaths as amended in 1896 has given this board for urging prompt action by local boards. Under this Act the secretary of the local board of health is required to forward to the Provincial Board of Health a report of every death from contagious disease, registered in the municipality during the preceding month. In this way the Provincial Board has been enabled to investigate local outbreaks, and where necessary, to insist on measures being taken by the local health authorities adequate for suppressing the disease.

In the matter of the inspection of meat and milk supplies, and the animals which supply these, the year has been marked by very notable progress. While it is true that both Federal and Municipal legislation has existed, adequate if put into force, to provide for a very efficient inspection of animals and food products, yet the fact that the matter has a most important commercial and financial bearing both in the case of the inspection and of the destruction of diseased animals and their products, has made the legislator loath to go farther than a public largely uninformed and in some cases unwilling, would be inclined to follow or be carried. That, however, a positive step in advance has been taken may be seen from the fact that the Provincial Legislature enacted a permissive law enabling urban municipalities to deal in a very thorough manner both with the inspection of animals upon slaughter, and the inspection of dairy cattle intended to supply the public with milk.

Already several urban municipalities have taken advantage of its provisions, and it is expected that the coming year will see a long step forward taken towards the general inspection of all food products of this character whether for home or foreign consumption. As regards the first, the safety of our own people makes it an urgent necessity, while with regard to the latter, the keenness of the competition and the activity of other countries in the work of supplying an inspected article will make such inspection of Canadian exported products a commercial necessity.

The past season too has seen the first measures of anything like a systematic character for inspecting those many little settlements of cottages and hotels all over our magnificent inland lakes and rivers, which are annually becoming, increasingly, the summer resorts of thousands of our people, as well as of visitors from the United States. While it is clear that its reputation for sanitary surroundings will do more than anything else to insure the success of any resort or hotel from the financial standpoint, yet it is a curious fact that whenever the attention of the persons most interested in these matters is called to the necessity for sanitary improvements, they seem to at once feel that those making the suggestion should undertake the remedy. The cry for inspection at the expense of some one else seems so general and natural, that the conviction grows that many in the community are prepared to submit to any amount of paternalism, provided they can be saved the trouble and expense of exercising their individual rights and responsibilities as citizens.

The laboratory work of the year, while not varying notably in character from that of the preceding, has, nevertheless, been extended in the various directions, which the facilities supplied, have rendered possible. All the public water supplies under construction, have been supervised, and numerous examinations of well waters from cities and towns desirous of closing contaminated wells have

been made. Examinations of sputum, of diphtheria exudates and of blood from cases of suspected typhoid fever have been numerous. Work regarding several cases of rabies has also been reported upon.

It may therefore be said that the year has been one in which progress has been made in the routine work which a public health department organized to do work along the several lines which have been referred to, will from time to time be called upon to perform. That the results have advanced the general well-being and happiness of the people at large, needs no demonstration, and that the appreciation both of the needs of public health work, and of the supplying of machinery for its extension and effectiveness, is slowly growing, is in several ways very evident.

That Canada should maintain the position already gained, is but due to her past history, and that Ontario the premier province in so many other matters, should in public health work do herself equal credit is the task which this Board has always set itself to perform.

CHAPTER II.

RECENT RESEARCHES ON TYPHOID FEVER.

In the chapters of the annual report proper, issued by the Provincial Board, it has been the custom to present a *resumé* of such conclusions as the officers of the Board have arrived at concerning some one or more of the many problems which they may have been called upon to deal with specially during the year. In the present chapter your secretary feels that he will rather be gathering together some of the facts which sanitary investigations and laboratory experiments by many workers have apparently elucidated in recent years regarding typhoid fever, which, apparently, of all diseases we have to deal with is that which presents most numerous phases, whether as to distribution, severity or seeming causation.

Unlike cholera in its distribution it is ubiquitous, for it may prevail within the limits of the tropics or in regions in the most northerly confines of settlement. The gold fields of South Africa and the mountain slopes of the Rockies north of the forty-ninth parallel are equally its habitat, when favoring conditions are present. Similarly as regards its severity or the type of the disease, epidemics of successive years may vary in type, and even two contemporaneous epidemics, one in the town and another in the contiguous country, may vary in the severity of the type. In the matter of seeming causation, we here again may have an outbreak which seems directly due to water, and another directly attributable to aerial infection from a sewer or privy.

Now, it will not be profitable to enlarge on these seeming anomalies, except so far as it may be necessary to illustrate some practical point.

The Specific Cause of Typhoid.—About this problem physicians, pathologists, and bacteriologists have in recent years and in the more recent past revolved, each endeavoring from a dozen standpoints to so focus scientific light upon it as once and forever to settle a question which is one of the most perplexing in the domain of medicine. One could wish it otherwise, but it must be confessed that Crookshank's statement made in the 1896 edition of his work on Bacteriology, and in the concluding sentence of his article on typhoid fever is true: that "The etiology of typhoid fever is still enveloped in doubt, and the nature of the contagion has not yet been determined."

This granted, however, it must now be equally accepted as a fact, that this causation is invariably associated in some manner, direct or indirect, with the presence of organic matter of an animal character, and even more specifically with that known as animal *excreta*. From the standpoint of the medical officer of health the full meaning of this assertion needs to be carefully considered. Prof. Cheeseman of Columbia University has recently used the following words: "I think it is pretty well established that water derived from uninhabited regions is harmless, so far as the presence of pathogenic organisms is concerned." Compare this statement with that contained in the report of a medical officer from one of the unsettled districts of our northern forest region where lumbering is carried on and many miles from settlements.

"I have just returned from visiting a lumber camp on Lake Wahnipitae, about eighteen miles from here. The camps are built on a shelving bank chiefly rock. The excreta of human beings, hogs and horses is all washed into the lake,

the cook camp being placed close to the lake from which the water supply is taken from about six feet from the shore. You will not, therefore, be surprised that there are cases of catarrhal enteritis." We have here, it would appear, two separate statements which in a very marked manner seem to orient the problem of the causation of typhoid. The latter is made more striking from the fact that these northern camps in Ontario are where the snows in the end of February have hardly begun to melt, and where every man who goes into the lumber camps to endure hard labor and the rough life must be supposed to have been in prime health on leaving home. Or, if possible, to illustrate the problem still more exactly, I quote from the report in the annual report of this Board for 1896, regarding the outbreak of typhoid in Windsor, Ont., in February of that year.

It will be remembered that Walkerville, a village of 1,500 population is situated three-quarters of a mile above Windsor, but draws its water supply from Lake St. Clair, which receives no sewage contamination, and except a very occasional imported case Walkerville never has any typhoid fever. The medical officer of Walkerville stated in evidence that one case occurred on the 1st of January, 1896. On the 25th of January the river was in flood from a severe thaw. In evidence Dr. R. Casgrain, Chairman of the Board of Water Commissioners, Windsor, stated, "On the morning of the 25th water drawn from the tap had a strong smell and tasted of manure. This lasted until afternoon, when the water was blown out of the hydrants. The cause of the sudden influx of manure was stated to me by a workman from Walker's to be due to the breaking of an embankment around the field where the dump was, and as the manure did not come so much by the afternoon it was stated to me the embankment was repaired." It may be mentioned that Walker's refers to the distillery, where the manure from some 3,000 cattle was stored during the winter on flat fields, with an embankment thrown up to prevent drainage therefrom passing into the large township ditch into which the main sewer of Walkerville empties just before the ditch, covered at this point, empties into the river and may deliver its contents into the Windsor water supply within twenty minutes.

The presence of fever in Windsor is given in the following table:

		Cases.
Week ending December 3rd, 1895.....		3
" " 10th, "		1
" " 17th, "		2
" " 24th, "		2
" " 31st, "		1
" January 7th, 1896.....		3
" " 14th, "		5
" " 21st, "		3
" " 28th, "		7
" February 4th, "		17
" " 11th, "		32
" " 18th, "		20
" " 25th, "		13
" March 3rd, "		7
" " 10th, "		3
" " 17th, "		3

On the 10th of March, 1896, the following resolution was unanimously adopted by the Windsor Physicians' and Surgeons' Association:—

Resolved, "That this Association is unanimously of the opinion that the present epidemic of typhoid and gastro-intestinal fever in Windsor, is due to polluted water supplied to the inhabitants."

A most interesting point bearing directly on the question of causation is the fact adverted to in evidence, that the Town of Sandwich below Windsor on the river, with only a few water consumers supplied by an extension from Windsor of a water main some two miles in length, suffered comparatively very little, as also did that part of Windsor farthest from the pumping-house. Assuming the flood of liquid manure to be the cause of the fever, the immunity above referred to is explained by the fact that this polluted water would hardly have reached Sandwich before the mains of Windsor were emptied by the hydrants, and clearer water to all parts pumped in, the flood of liquid manure having largely passed down the stream and the inshore valve of the intake pipe having been cleared.

Never, probably, has a similar condition been developed, and we are forced to deal with the fact first of the outlet sewer from the Town of Walkerville, which town had no typhoid, excepting a single case a month previous, which had for three weeks shown no special virulence as causing other cases at Windsor, and the associated fact that the Windsor cases reported, jump up from three cases to thirty-two per week, within the fortnight following the flood of manure, while these latter cases were all located in houses on that portion of the system where the principal part of the polluted water must necessarily have been supplied.

While millions of gallons of water impregnated with manure must have gone down in a few hours, the admixture of any of this with Walkerville sewage, which would not be more, all told, than 150,000 gallons in twenty-four hours, would be only during a period of twenty minutes before the polluted water reached the Windsor intake.

In a paper by Remlinger and Schneider of the Val-de-Grâce laboratory, on "The Ubiquity of the Typhoid Bacillus," printed in the Journal of the Pasteur Institute of February, 1897, the authors attempt to answer the question: "Does the bacillus of typhoid exist in nature outside the sick man, and the products which emanate from him?"

A series of experiments extending over many months was carried out on various materials, such as the public water supplies and wells of several towns, having epidemics of typhoid, the soil of different localities, the discharges from the digestive tract of persons not affected with typhoid, on dust, etc., etc., and a bacillus giving all the principal laboratory reactions of that of typhoid was obtained from all these sources. The following illustrations are of special interest:—

In thirteen samples of dust from different places, the bacillus typhosus was found seven times, (*a*) in the refuse from a barracks where were some cases of typhoid, (*b*) in dust from the laboratory floor, (*c*) in the space between the joists of a room in a barracks, (*d*) in four specimens of soil, both superficial and a metre in depth, from the courts and gardens of Val-de-Grâce. These in three instances were pathogenic for animals.

In the examination of the faeces of ten persons treated at the hospital for affections which had nothing in common with typhoid, five reacted like the bacillus typhosus. Thus (*a*) in a case of leucothyaemia specimens examined at intervals of fifteen days, gave each time a positive result, (*b*) in one case of acute tuberculosis without intestinal lesions, (*c*) in a case of premonitory dysentery, (*d*) in two cases of chronic malaria. None of these patients had ever had typhoid fever.

Of bacilli from five cases, four were pathogenic for guinea-pigs.

In many additional cultures from water, soil, and the intestines, bacilli with every characteristic of bacillus typhosus were found, except that they were not

pathogenic for man, and were not agglutinated by the serum from a typhoid patient. In other words they seemed the same species, but attenuated as to virulence. After some remarks illustrated by comparisons with the variations of the cholera vibrio, these investigators state :—

“ It is allowable to suppose that facts of a similar kind reproduce themselves in the matter of the bacillus typhosus.”

“ The species of the bacillus of Eberth, comprehends perhaps varieties more or less numerous, which do not probably react similarly under the influence of the serum of an animal immunized against a determined variety. The belief in the invariability of type in pathogenic microbes, is to-day much weakened by many facts. The question of race, descendants from a common stock, but altered by unknown vicissitudes, acquires an importance which must not be underrated. Why should not this theory apply to the bacillus typhosus? We incline to think that bacilli not pathogenic, and indifferent to the serum test, which are encountered in water, soil, etc., are only definitive types of the bacillus typhosus; at least the parentage is evident even if the identity is not absolute. This diversity of fundamental type will perhaps serve to explain the variable forms of typhoid infection, which are becoming recognized.”

“ If this interpretation of facts is exact, the following conclusion will result : The bacillus typhosus is distributed in nature outside the human body; it is found in potable waters, in soil, in the intestines of persons not attacked with typhoid, and without doubt forms a part of the microbic flora of these media which surround us. The idea is not subversive of recognized facts as to the general causation of typhoid, but rather enables us to conceive and comprehend facts otherwise inexplicable.”

“ Observations of all times, especially noted in rural places, have set in relief the part played by the contagion in the formation and extension of certain epidemic centres; their value remains. Modern researches have demonstrated the prime importance of impure waters in its development and spread; the character of the proof defies all question. But it is necessary that all the cases originate from contagion or water polluted with the dejections of typhoid patients. Many times it breaks out in patients or groups worn out with fatigue, overwork or privations, or after eating various foods, without which it would be possible to trace the origin of the contagion in the use of a badly polluted water.

“ The facts conform more easily with the idea of the widespread presence of the bacillus typhosus, which admits its dispersion in the air (dust) and its presence eventually in our natural cavities.”

“ A water reputed pure may carry it: once introduced into the organism, it will live there unoffensive till some depressing circumstance, a fortuitous assistance, perhaps the result of some associated microbe, will open to it a career of action.”

“ This common distribution of the germ, its presence more or less frequent, in the natural cavities, will raise the question of the proper conditions to favor eventually its pathogenic action.”

“ On this point we can only suggest hypotheses. But in the presence of the undeniable role of impure water in the genesis of the disease, we must study when their mode of action is not diverse, some carrying the germ, others carrying certain bacteria, which favor perhaps the development of the bacillus already present in the digestive tract.”

These extended quotations from this paper have been made because they very neatly sum up a number of conclusions, which most who have attempted to

harmonize bacteriological investigations and facts associated with outbreaks of typhoid are forced to accept in several important points.

The conclusion arrived at, however, that the specific germ, or the bacillus typhosus, is practically ubiquitous, as for instance in those forest camps of more than a hundred miles away from settlements, because it has been found in the waters and soils of cities and towns, and in the digestive tracts of persons who breathe this air, does not appear to me satisfactory in connection with the causation of such outbreaks, unless indeed it be assumed that bacillus typhosus has the digestive tract of man as one of its normal habitats, in the same manner as other forms, notably bacillus coli, living there indeed normally as saprophytes on the dead matter which constitutes the food of the individual. In other words, that like the latter the bacillus typhosus is a hemi-saprophyte (or facultative parasite), not normally parasitic and pathogenic, but only occasionally so, as illustrated by the experiments of Remlinger and Schneider, with culture forms, whether found in materials, external to or from digestive tracts.

This theory would indeed be a perfectly logical one from the experiment quoted wherein the bacillus typhosus was found in five out of ten patients who had never suffered and who were not then suffering from the disease, if we are to assume that an examination of the faeces of any other ten persons outside the hospital walls, or of a city, say in a lumber camp, would yield the same results.

The experiments often made whereby the bacillus of diphtheria has been found in the throats of persons in the wards of hospitals, and yet who were not suffering from the disease are of a similar character. It would appear therefore that we are either forced to this conclusion as to the facultative parasitism of bacillus typhosus, or to the alternative position of assuming the oft-repeated suggestion or assertion as expressed by Zeigler, that, "the two bacilli (bacillus coli and bacillus typhosus) represent only varieties of one kind, and consequently that the two forms may pass over into each other."

While it is quite true that culture processes have yet failed to transform either bacillus into the other, yet where it is now known as illustrated by many, that some forms of bacillus typhosus are not agglutinated by the serum of typhoid patients, and are not pathogenic for guinea pigs, while on the other hand the bacillus coli, may take on a pathogenic character as in the body cavities, notably in the presence of septic forms (e. g. streptococcus) it would seem to be almost a matter of indifference, which position is accepted as the correct one.

If, however, it be assumed that the bacillus coli is capable of taking on a virulence making it practically the cause of typhoid, the acknowledged ubiquity of this bacillus as in the manure of the streets, stables and yards, and its constant presence in our milk supplies, as ordinarily received and prepared, would force us to expect the presence of typhoid a hundred times, and in a hundred places where people are perfectly free from it. We are forced nevertheless, in such notable illustrations as that of the Windsor outbreak, to assume either one of several positions, (a) that the bacillus typhosus, which, under the conditions already noted, was present in great quantity and virulence in the sewage, at the very moment that the several million gallons of diluted cow-manure passed into the river and the Windsor water pipes; (b) that the presence of such a quantity of cow-manure, even though for so short a time in the Windsor pipes, was the condition of developing a virulence and multiplication in the bacillus typhosus which we have assumed passed in with the Walkerville sewage, a point really not proven; (c) that the amount of cow-manure in the drinking water was *per se* an irritant producing an intoxication resulting in a continued fever; (d) that the bacillus coli lying external to the body of animals in a manure heap, was subjected to conditions which caused it to develop a virulence productive of the outbreak of fever.

Now if the problem be broadened out to include such instances as the severe outbreaks of so called mountain fever in mining camps, in places where no animals may have yet been, but where the virgin soil has been torn up, and the bacillus coli (and bacillus typhosus facultative?) from the discharges of the miners have been subjected to conditions external to the body, as saprophyte in freshly turned humus, we may find here a satisfactory explanation of the outbreaks, if we assume that the conditions have developed a virulence in either germ, and that thereafter it has reached the drinking water.

With the several alternative positions which it thus seems possible to take, it may be said that we are no farther advanced toward a conclusion; but it is well in any event that we endeavor to draw distinctions where we can, in order to give practical directions to our efforts to remove those conditions which directly occasion the presence of the disease. We were taught many years ago that the discharges from the bowels of typhoid patients were not infective until they had been exposed some little time to the air. It is curious how such a conclusion came to be taught, but at any rate it would seem as if enough of facts had been observed by those old clinicians as to lead them to this broad generalization. Certain it is that such facts as have been commented upon above, point to the conclusion that the life-history of the germ of typhoid depends in, at any rate some instances, upon an existence external to the human body for the evolution of a virulence, and a vital activity, which are recognized even if the conditions of its development are not understood. Medical officers of health and physicians have many times had occasion to remark on what have come to be called by them "typhoid wells." Who has not known a house-well on some rented property, which had caused a serious outbreak of fever in the tenant's family? and who has not known case after case, when the tenant of one year has been succeeded by another in the next, whose family have used the well water with perfect immunity until the summer months, when the ground water lowering and its temperature increasing, they have in August or September been attacked with typhoid? Or who has not known a typhoid-producing river, supplying a town during the spring months, without any notable outbreak, which becomes on the occasion of a flood, which washes out the street ditches and drains of the towns and villages above, being towards autumn, the occasion within a fortnight thereafter of a more or less serious outbreak of fever? These broad facts seem to inevitably lead to the conclusion that the germ, whatever be its type, has a true saprophytic existence and that it is most closely allied to yellow fever and cholera, as a hemisaprophyte.

Apart from our ability to cultivate the bacillus typhosus, bacillus coli, the comma bacillus etc., we have this condition as a common one in many of the forms of fungi, as mucor, penicillium and botrytes, which play such important parts in the diseases affecting the higher plants and their fruits.

In these too, as remarked by Remlinger and Schneider regarding bacillus typhosus, the conditions favoring their attacks, are similarly those where wounds in the bark and wood of trees, and abrasions or imperfect development in the rinds of fruits, mark a condition of lessened vital energy or of resistance to the attack of the parasite.

Were we to sum up the conclusions derived from the observations of many facts we would say:

1st. There is at least one variety of bacillus, a hemi-parasite capable of producing typhoid fever.

2nd. That it has extreme varieties in its virulence from a condition where it may apparently live in the digestive tract of man for weeks as a saprophyte, without apparently affecting the general health, to that where taken into the

system as with water, of a vigorous and perfectly healthy young person, it will develop a virulent type of fever within ten days to a fortnight.

3rd. That this virulence is transmitted to the bacillus in such a degree that direct infection by the handling of bed-linen, or breathing the air of an infected apartment is not only possible but takes place if great care is not exercised, with considerable certainty.

4th. That mild types of the bacillus may by living external to the body as saprophytes, notably in shallow wells and in old house drains and gutters, apart from free oxygen and sunlight with abundant nutriment develop a virulence of a marked character.

5th. That virulent types of the bacillus, passing into the running waters of streams, tend to become notably attenuated, unless where carried along during flood times with the organic debris from sewers, ditches and the alluvium and clay which for days together may render such waters turbid.

6th. That this saprophyte, harmless where present in the digestive tract of many healthy persons, may, when mingled with organic material as stable manure, humus, etc., and carried into lakes, pit wells, etc., notably in winter, when owing to the ice the water has a limited amount of oxygen, develop a virulence capable of setting up fever of greater or less intensity.

7th. That should the general presence of the bacillus typhosus in the intestinal tract of man, as a harmless saprophyte be denied, then there seems no alternative but to conclude that the bacillus coli, which is normally a facultative parasite of the intestinal tract of man and animals, is capable of producing a fever not to be differentiated from that caused by bacillus typhosus.

From the preventive standpoint, it would seem as if on either theory the same lessons are to be learned, and the same rules to govern our dealing with animal excreta of every kind. The following from the health officer's standpoint may be postulated :

1. Given a public water supply or a private well supply, free from possible contamination, and a general system of good house-plumbing and properly constructed street sewerage, and typhoid fever will be practically absent from a town.
2. Given a public water supply free from possible contamination, yet with defective house-plumbing in some houses and old fashioned street sewers, and typhoid will be largely absent from a town : but cases will occur.
3. Given a pure public water supply, but with privy pits in a town, and localized outbreaks of typhoid will occur ; but not where a regular system of removal with dry-earth or ash closets exists.
4. Given a system of dry-earth closets with regular removal in a new town and house-wells well protected against pollution from the surface, and we may maintain a town fairly free from disease.
5. Given the general use of private wells and privy pits, whether located in town or country, with a sandy loam on top of clay and within a few years, there will be an annual prevalence of typhoid in the late summer and autumn months, notably in dry summers.
6. Given the use of water for drinking purposes from a well situated in a barnyard, in which soakage is inevitable through a permeable soil, and outbreaks of typhoid will, with much certainty, occur on the farm and in persons using the milk supplied from such farms, even though no history of a previous case of typhoid having occurred on the premises can be obtained.

The lessons to be taught and learned from these statements are sufficiently obvious, and it will be apparent that with the now fairly developed means of diagnosing typhoid, we cannot fail in coming years to add still more to our knowledge of the causes which produce outbreaks of the disease.

CHAPTER III.

LIFE AND WORK OF LOUIS PASTEUR.*

Pasteur's origin was of the humblest: his father had been a soldier in the armies of Napoleon, and had been decorated on the field of battle. Upon leaving the army he had returned to his hereditary trade of tanner and had settled at Dole where his son was born in 1822. The father was apparently a very characteristic type of Napoleonic soldier, an ardent Republican, yet worshipping the Emperor as only a soldier of the Empire could. He instilled into his son his own peculiar patriotism, a patriotism which placed France before everything, so that the practical results of his researches were freely given to his country and his greatest reward was to have heard Huxley acknowledge that their results had actually repaid France more than the whole war indemnity paid to Germany, a patriotism which had also its channomistic side which had led him to return his honorary degree of Doctor of Philosophy to Bonn when the Germans bombarded Paris and led him to refuse a German decoration even before it was offered.

The father was bookish, however, and the mother ambitious and Louis was their only child, and they no doubt early decided that he should do something greater than follow his ancestors in the business of tanning. He therefore went to school early at Arbois, to which place the family had removed when he was three years old, and from there he went for a year to the college of Besançon, where he obtained his diploma of Bachelor of Letters. In Besançon he first obtained his taste of chemistry which directed his future studies. He left there for the École Normale of Paris, entering fourteenth on the list, but not satisfied with his position he withdrew for a year and took the examination again, when he passed fourth.

At the École Normale he studied chemistry under Balard but also attended the course in chemistry given by Dumas at the Sorbonne. Whilst there he was much influenced by Delafosse, who infected him with his interest in crystallographic studies and practically launched him upon the investigation which first attracted the attention of scientific men to him.

After graduation at the École Normale he was a short time professor at Dijon, and at the age of twenty-nine was called to Strasburg as professor of chemistry. Three years later he went to Lille as dean of the faculty of science, and after remaining there three years he returned to Paris as director of scientific studies at his old school, the École Normale. Later he was made professor of geology, physics and chemistry at the Beauxarts, and then professor of chemistry at the Sorbonne, finally being appointed director of the Pasteur Institute in 1887-8.

The brief resumé shows how markedly from the very first Pasteur's great qualities were recognized, and it would seem that when we listen to the various chairs which he occupied that his scientific labors were carried on under most favorable auspices. We must remember, however, that a great part of this period was long before the time of large, well-equipped laboratories, and that men, who, like Pasteur, followed so faithfully the experimental methods of research, labored under difficulties which would seem to us to-day as insurmountable.

*Paper delivered in series of Toronto University afternoon lectures by J. J. Mackenzie, B.A., Bacteriologist to the Provincial Board of Health.

able. In fact, when professor at the École Normale, Pasteur had to be satisfied with a room ten feet square in the attic which he equipped at his own expense. And yet when one reads his original papers one is struck with the remarkable accuracy of his work and the success of his experiments so that one forgets entirely the unfavorable circumstances which must have attended many of them. It is when we look at these results and remember these facts that we are more than ever impressed by the genius of the man.

There is little to say about Pasteur's personal character. He was modest to a degree, yet when convinced that he was right it was absolutely impossible to restrain him.

Bertrand, the president of the French Academy, gives a short anecdote which is worth repeating. One day, in the Academy of Sciences, when very much annoyed by the opposition of two opponents, who would not be convinced by his experiments, he wound up a thundering response by the following: "Do you know what is the matter," turning to the one, "you do not know how to observe." Then to the other, "You do not know how to reason." These rather startling statements aroused a murmuring protest and he at once realized what he had done and apologized, then he said, "I have acknowledged my rudeness and have made amends, may it not be permitted me to offer extenuating circumstances. All that I have said was true," then after a slight pause, "absolutely true." The frankness and innocence of this conclusion was greeted with shouts of laughter in which his two opponents heartily joined.

He was a man much loved by those who came in contact with him, and one sees in all the work of his pupils a veneration, almost a worship, of the master.

He had an absolute passion for work, it is said that when he lived at École Normale he could be heard sometimes in the middle of the night rushing off to his laboratory when some sudden idea struck him. His passion for work kept him at it in spite of a severe attack of paralysis in 1868 until with gradually failing powers he finally gave it up in 1887, and from that period until his death his constant complaint was, "I cannot work."

Shortly after graduation at the École Normale Pasteur turned his attention to crystallographic studies as a result of the influence of Delafosse

I do not purpose to-day to touch at any length upon this early work, but it is of interest in many ways. It shows at the very outset of his career the possession of those qualities which distinguished him throughout life. A scientific imagination, almost an intuition, which enabled him to foresee what ought to be the explanation of a series of phenomena and a capacity for close observation and accurate experimentation which placed these explanations beyond a doubt. It was of importance also because the startling character of his results brought him prominently before the scientific world and led to his removal to Strasburg as professor of chemistry, and it was out of it that grew his observations upon fermentations which ultimately led him into the field of micro-biology. It was important finally on account of its intrinsic merit, as in it we have the germs of a great department of modern chemistry.

The work was an inquiry into the behavior of certain salts of tartaric acid in relation to polarized light.

It had been known that there existed crystals of a peculiar dyssymmetrical form which caused a rotation in a definite direction of a beam of polarized light. It had been found also that there was a relationship between this dyssymmetry and the action on polarized light. If a substance occurred in the form of two

dyssymmetrical crystals, the one simply a mirror picture of the other, i.e., with the same facets and angles only reversed, the one rotated the polarized light to the left, the other to the right.

Now Pasteur's idea was that whenever there existed this peculiar polarization phenomenon it must be due to a peculiarity in molecular structure and must also be expressed by its outward form, that is by its crystallization. The tartrates showed this phenomenon, i.e., they rotate the light to the right, but it had been claimed that their crystals were not dyssymmetrical. He set himself to examine them and discovered that this was a mistake, that they were not symmetrical. But the tartrates showed the peculiar rotary phenomenon when dissolved and there had been discovered certain tartrates (called para tartrates) which had the identical characters of the tartrates with this difference only that they did not affect the beam of polarized light, they did not rotate it either to the left or to the right. The question was how to explain this difficulty. The explanation was finally found to be that paratartaric acid was a mixture of two tartaric acids identical in composition but differing in this, that the one rotates the polarized light to the right, the other to the left, and consequently when mixed as the paratartaric acid they mutually counteracted each other and were inert. An examination of these crystals also showed that the dextro-rotary crystal was a mirror picture of the laevo-rotary and that they were therefore both dyssymmetrical. The fact, however, that when dissolved in water their acids had the same action, and a similar fact observed in other compounds led Pasteur to formulate the brilliant idea that the molecules of which these compounds were made up were dyssymmetrical, i.e., that the atoms which made up the molecules, although the same in number and in character, are arranged in different ways about a solid figure.

This idea is the germ idea which lies at the bottom of that branch of modern chemistry which we know as stereo chemistry, and it is quite evident from this early piece of work that if Pasteur had remained a pure chemist he would still have made for himself a brilliant future.

He was, however, led away, and in a peculiar manner. He had conceived the idea, since shown to be incorrect, that all bodies which in solution have this peculiar action upon polarized light must be produced as the result of the activity of living structures, plants or animals. The facts in possession of the world at that period warranted such an assumption. In his studies upon the tartrates he noted one day the spontaneous fermentation of tartrate of ammonia. The thought occurred to him to put a few drops of the fermenting mixture into a paratartrate solution and observe the result. Fermentation took place here, but the curious discovery was made that as the fermentation progressed the solution, which you remember had no action on polarization gradually acquired the power of rotating to the left until it reached a maximum when all change ceased. Pasteur naturally argued that the dextro-rotary tartrate had been destroyed, the laevo-rotary not, and he further argued, reasoning from his pre-conceived ideas as to the relation between living organisms and dyssymmetrical molecules, that the fermentation must be produced by living organisms. Of course this idea as to the nature of fermentation was in the air but it was being fiercely combatted by chemists, and we find as a result of this observation Pasteur thrown at once into the field of struggle, not only as to the cause of fermentation but as to the question of spontaneous generation.

A very curious fact in regard to the whole thing is this, that it was only a simple chance which infected Pasteur's ammonium tartrate solution with an organism which attacked only the dextrorotary tartrate, it might have been one

which attacked the laevorotary and it might have been one which destroyed both, for such exist, and in that case his attention might have been directed elsewhere. It was, however, turned to the subject of fermentation and he found in the study of fermentation a field sufficiently chaotic to supply even his tremendous energies with work.

It is a curious fact that the phenomena of fermentation were apparently among the earliest natural phenomena observed and turned by man to practical account when he first began to practice the arts and be a man. Yet, although fermentation had been studied and examined through all the ages up to the present century, no set of natural phenomena were more misunderstood and more cumbered with errors of explanation and interpretation than these. This was largely due to the fact that around them had clustered all sorts of metaphysical and mystical ideas, owing to the theories of the philosophers and alchemists of the middle ages.

There had been a few great minds, however, who saw beyond these theories, Robert Boyle, for instance, who said that if we could explain the phenomena of fermentation we could explain those of disease, and Paracelsus who believed that all disease was simply a process of fermentation, but even these men built their theories out of other theories and not as the result of experimentation.

Even before Pasteur in this century there were a few men who were on the right track and were offering vitalistic explanations, men like Schwann, Cagniard, Latour and Helmholtz. Already in 1835 Schwann had recognized the presence of the yeast plant in alcoholic fermentation and believed in its causative action there; and Helmholtz, following up his work by skilful experiments, put the matter upon a still firmer basis, but the work of these men was largely overshadowed by the authority of Leibig, who believed that it was possible to explain fermentations by purely chemical means, although he had to accept the result of Helmholtz's work so far as to admit that the presence of the yeast was necessary but only in so far as it was the spark which set off the chemical explosion which results from the fermentation of sugar. He maintained, however, that in a number of fermentations (lactic acid for instance) and all forms of putrefaction yeast plants were absent, and consequently we had to fall back entirely upon chemical explanations.

It was quite natural then that Pasteur, a chemist, should turn his attention to such a subject.

For many reasons Pasteur first took hold of the lactic acid fermentation of milk. The chief, perhaps, was because of its being a comparatively unworked field and because it formed an apparent exception to Schwann's and Helmholtz's observations in regard to the presence of yeast in fermentations. Although Leibig admitted the presence of living cells in alcoholic fermentation he naturally asked what use can they be when we have other fermentations where they are absent. Pasteur, of course, attacked the question with a vitalistic explanation in his mind.

In a short memoir of fifteen pages he showed with remarkable clearness that there was present a distinct ferment, that this ferment reproduced itself, one sowed a minute trace, one reaped a large harvest; it, therefore, must be living since it reproduced itself, and examined under the microscope all the individual particles had the same form and were the same as those sown. He also brought out certain important facts with regard to the biology of this germ. He discovered that while the yeast plant required a sugary solution with an acid reaction, the lactic germ required one with a neutral or alkaline reaction. In this memoir also

he touches briefly upon the injurious action upon fermentation of certain essential oils, the first words which we have upon the subject of antiseptics. And he concludes his paper with a general profession of faith which reads as follows: "It is my opinion, at the point to which I have now brought my researches upon this subject, that whoever will judge impartially the results of this work and those which I will publish shortly, will recognize with me that fermentation shows itself correlative with the life and organization of globules, not with their death and putrefaction." In this he announces the appearance of his work upon alcoholic fermentation.

This work was no less complete in its methods and convincing in its result than the other, and in it he introduces for the first time what has many times since been the *experimentum crucis* in micro biological research. This was the introduction of a culture fluid made up of mineral salts and containing no trace of organic nitrogen. This was necessary because Leibig maintained that nitrogenous organic matter must be present which by its decomposition sets free the peculiar force which begins and carries on fermentation. If fermentation went on in the absence of such substances then one of the strong points of Liebig's argument fell to the ground. It seems to us, perhaps, a simple experiment to-day, it is such a common laboratory process, but it must have cost Pasteur endless thought before he carried it to completion.

In pursuing his researches Pasteur followed up another interesting form of fermentation. It had been known that when lactic acid fermentation of milk had ceased, there was a secondary fermentation which resulted in the formation of butyric acid and other compounds which were recognized by their peculiar rancid odor.

Pasteur found that whilst the lactic acid fermentation was produced by little motionless globules which might easily be interpreted as small yeast cells, the butyric acid fermentation was associated with the pressure of minute rodlets which were very mobile and which were consequently considered by him to be animals. We know now that they are vegetable cells or bacteria, and that the phenomenon of motility is not alone associated with animal life but it was at that time a peculiarly interesting observation.

He also discovered this other peculiar fact in regard to butyric acid fermentation that whilst all other ferments required the presence of oxygen in which to grow, in fact oxygen was considered hitherto a *sine qua non* in fermentations, this fermentation not only took place in the absence of oxygen but oxygen was directly injurious to it.

This was the first recognition of two great groups of bacterial cells, those which require oxygen and those which require the absence of oxygen. He stated the conditions which he had found to Chassany, professor of Greek at the Ecole Normale and asked for two words to express these conditions. Chassany suggested *arrobe* and *anærobe*, terms which we use to-day.

With all these researches upon fermentation Pasteur was naturally brought face to face with one of the great unsettled questions of his day, viz., the question of spontaneous generation. When fermentation occurred in an organic infusion was it due to organisms spontaneously developed in the solution, or was it necessary that these organisms should be introduced from without?

About this question endless battles had been fought for over a century and still it was not settled. It was known that boiling a solution and preventing the entrance of air frequently prevented fermentation. The same thing could be done and the air allowed to bubble in through strong acids, but the whole proof

that spontaneous generation could not occur was open to the objection that the method of treating the solution and treating the air destroyed in some way the power of the air to produce fermentation and the technical methods were so complicated and the experimental results so contradictory that in spite of many years of investigation the question was quite unsettled.

With the desire of having the subject cleared up the French Academy of Sciences of 1858 offered a prize for the following: "To endeavor by well-conducted experiments to throw new light upon the question of spontaneous generation"

Pasteur resolved to attempt it, but at that time it was in such an unsatisfactory condition, that, as he says himself Biot, one of his masters, saw him attack the question with regret and asked him for a limit of time beyond which he promised not to pursue it if not successful. Dumas, another of his old professors, advised him against attempting it and said, "I would never advise anyone to waste much time over such a question."

Pasteur was not to be restrained, however, and when one reads his original paper, one is struck with the directness with which he attacked it, and the simplicity of the methods by means of which he attained his end. His results were so conclusive as to prove completely the absence of spontaneous generation, and to do so, so thoroughly as to render very little more work necessary, in spite of the strenuous opposition which they aroused.

Pasteur began his work by examining the air, by filtering it through gun cotton. He used this material on account of the fact that he was able to dissolve it without affecting the dust, and a microscopic examination of this dust showed him the presence of minute structures which he believed to be the same as those which he had seen in fermenting solutions. Having proved the presence of such structures in the air, his next step was to determine the influence of the air upon the process of fermentation of organic solutions. His method was as follows: a flask was filled with organic matter and the neck softened by heat and drawn out. The organic solution was boiled for some time and the neck connected with a platinum tube which was heated to redness. As the organic solution cooled the air from outside passed in but in passing it traversed the red-hot platinum tube and consequently all living organisms were killed by the heat. After the solution was cooled down the flask was sealed and set aside, prolonged observation showed that no life developed in it. It was as we say to-day sterile.

By an ingenious arrangement he also placed a little plug of cotton wool loaded with dust in the neck of one of the flasks. The contents of the flask remained sterile as long as the cotton wool was not disturbed, but as soon as it was shaken down into the solution fermentation began. This proved, first, that heating had not damaged the air, so that fermentation took place as well in the air which had been heated as in unheated air, provided atmospheric dust were introduced into the solution. It also proved conclusively the causative action of the atmospheric dust

In spite of these experiments it was objected, that the heating of the air had caused a chemical change in it which prevented spontaneous generation.

To answer the question finally he adopted a very simple device.

A flask filled with an organic solution had its neck drawn out, but instead of being drawn out straight it described a long swan's neck curve, or it was given a number of bends in its course, but instead of sealing it, it was left open. The solution was boiled until steam streamed from the end of the neck, and then it was allowed to cool. As it cooled gradually the air passed gradually back into

the flask, but in so doing had to pass through the swan or tortuous neck. As a result germs, which were in the air, came in contact with the walls of the moistened neck and lodged there, so that by the time the air reached the solution in the flask it was deprived of its germs. The result was that no fermentation occurred. It is strange that in the face of these definite results there were a few individuals who still held out in favor of spontaneous generation, but one by one they had to give in, and the question to-day is as dead as if it had never existed.

Connected with this investigation was one also upon the distribution of germs in the atmosphere, and it was shown that when a flask was boiled, sealed whilst boiling and then opened in the air of Paris it practically always fermented, but when opened in the air upon the mountains it did not always ferment, showing that the air of Paris contained very many germs, whilst mountain air contained very few or none at all.

These experiments were opposed by Pouchet, one of the strongest advocates of spontaneous generation. He maintained that he had discovered no difference between city air and mountain air, that indifferently they always produced fermentation. The matter was referred to a Commission of the Academy, and Pasteur appeared before the commission ready to repeat his experiments. Pouchet appeared also, but defaulted as far as experiments were concerned, and refused to repeat any.

It is a curious fact that if he had repeated his experiments he would, for the time, have triumphed, because, whilst Pasteur was working with solutions in which apparently there were no bacterial spores, i.e., they would be sterilized by boiling, Poucet was working with hay infusions which contain the spores of *bacillus subtilis*, which are not destroyed by boiling. *Bacillus subtilis* or the hay bacillus requires the presence of air in which to grow, and consequently when all the air is driven out of the flask by boiling it, the hay bacillus even if present will not grow, but as soon as the air is admitted, no matter whether heated or not, no matter whether city or mountain air, the unkilld spores germinate and an apparent spontaneous generation appears.

Pasteur discovered this fact for himself later, and found that although boiling did not kill the hay bacillus spores, a temperature slightly above boiling point did.

Although the explanation of the phenomena of fermentation and putrefaction and the final settlement of the question of spontaneous generation were interesting from a scientific standpoint, as yet the practical results were small.

It remained for a Scottish surgeon, Lister, to put to practical use the results of Pasteur's labors. He had watched with interest and repeated Pasteur's experiments upon fermentation and putrefaction, and he at once saw their bearing upon surgery. For if Leibig were right in believing that air and air alone was responsible for putrefaction, then there was little hope of improving the art of surgery, exposed as it was to the results of putrefactive changes in wounds, but if Pasteur were right in believing that only the germs that are present in the air were the cause of putrefaction, then surgical results might be enormously improved by preventing their access to a wound or by killing them after they had lodged there.

Lister, having convinced himself that Pasteur was right, set to work to put his ideas into practice. As it seemed hopeless to avoid the germs which were present in the atmosphere, he determined to try and destroy those which came in contact with the wound, and he used for this purpose carbolic acid, then almost a chemical curiosity. The results of Lister's application of Pasteur's idea to surgery far exceeded his most sanguine hopes.

Lister has but recently consented to speak publicly in regard to his share in the application of antiseptic methods to surgery, and he has done so in his presidential address at the Liverpool meeting of the British Association. The portion of his address which deals with this subject is characteristic of the man in the modest claims which he makes for himself and the glory which he gives to Pasteur. But in this address he mentions one or two facts which show very clearly what were the results of the introduction of antiseptic methods. The lay public of to-day is so familiar with these results in the hands of our skilful surgeons that it does not realize the state of affairs which existed before their introduction. Lister instances in this regard the condition which existed in a large Munich hospital under the control of von Nussbaum. The terrible disease called hospital gangrene, which was always the terror of hospital surgeons in pre-antiseptic days, had become more and more prevalent in the Munich hospital until it finally reached such alarming prevalence that over eighty per cent. of all wounds became infected with it, and the authorities felt themselves powerless to cope with it and were considering the advisability of destroying the hospital and rebuilding it. Von Nussbaum, however, had heard of Lister's results in Glasgow and Edinburgh, and sent his assistant to the latter place to follow for a few months under Lister's direction the antiseptic method. He returned and immediately put them in practice in Munich, with the result that not another case of hospital gangrene occurred, and other septic diseases quickly disappeared.

These startling results were the direct consequence of the genius of Lister putting into practice the methods of Pasteur, and if Pasteur's work had ceased here he would have still been one of the greatest of human benefactors.

I will not take time to discuss the work of Pasteur which immediately followed upon his observations on spontaneous generation. It was chiefly along the line of wine fermentation and vinegar production, but the practical economic results to the wine and vinegar industries were of such importance that it meant the saving of many thousands of francs. In the production of wine he introduced the process of pasteurization, *i.e.*, the heating of the wine up to a certain temperature so as to destroy the bacteria which produced the injurious after-fermentation which spoils the flavor.

In connection with the vinegar manufactory he discovered the cause in the so called mother of vinegar or *mycoderma aceti* and determined the conditions most favorable for the production of the vinegar. In this connection he had his last battle with Leibig who still held to his old chemical ideas as to the explanation of fermentations.

Pasteur's position as an investigator of the obscure phenomena of fermentations and the biology of bacteria was by this time assured, and it was natural that when the silk worm disease in the south of France had reached such an extent as to threaten the extinction of the whole silk industry, the French nation should turn to him as the only man likely to discover some means of coping with it.

Pasteur gave up with reluctance his studies in fermentation which had proved so interesting, but his old friend and master Dumas would take no refusal but insisted that he should investigate the silk worm disease. He complained to Dumas that he knew absolutely nothing about silk worm culture or silk worm disease and Dumas responded, "So much the better, you will have only such ideas as come to you as the result of observation."

He finally consented and threw himself into the work with his accustomed vigor, with so much vigor indeed, that before his work was finished he had ruined his health and was struck down with paralysis which ever after limited his activity.

The disease which had played the greatest havoc with the silk worm was called pebrine, which caused the death of the worms before they reached the cocoon stage, the first symptom of the disease being the appearance of black patches on the worms. There had been observed in the diseased worms and in the eggs, corpuscles which were believed by some to be the cause of the disease. Pasteur's contribution to the subject was to show conclusively that these corpuscles were the cause, and that although the infection might take place during the larval stage it was transmitted to the egg by the moth and then became more serious. The worm infected after hatching might have enough vitality to pass through the cocoon stage and become a fully matured moth, but this moth would produce infected eggs which gave rise to diseased larvae, which died before the cocoon stage was reached.

The recognition of the transmissibility by the egg put Pasteur upon the track of the correct method of combatting the disease, that is, the so called method of "grainage." This consisted in examining microscopically a certain number of the eggs of each moth or in examining the moth itself after the eggs are laid, and if the corpuscles were present rejecting all the eggs. Consequently only healthy eggs were allowed to hatch, these produced healthy larvae, and if infection were prevented during larval life an increasing number of healthy moths were obtained. There are certain details in regard to this, which there is not time to go into but these are the essentials of the method. Pasteur was confused at first by the fact that there were really two diseases, the *pebrine*, the most serious, which was caused by the so-called corpuscles, structures which we now know to be minute animals, and *flacherie*, a disease which is caused by bacteria. These two diseases at first led to confusion, but he subsequently learned to recognize the difference and to provide means for the prevention of both.

The practical results of Pasteur's labors were therefore along the line of a true prophylaxis, and as soon as his methods became generally adopted, they had a most remarkable effect upon the silk industry. In 1853 the silk industry had produced twenty-six million kilos of cocoons, or a value of 130 millions of francs, from that year, owing to the spread of pebrine, it dropped rapidly to only four million kilos or about twenty millions of francs, an annual loss of over 100 millions of francs; as a result of his labors, the industry again flourished. But aside altogether from the practical economic results obtained in this work, he was gaining an insight into the etiology of parasitic diseases, and in Vol. I of his studies upon the silk worm disease, he utters these prophetic words: "It is in the power of man to cause parasitic maladies to disappear from the face of the earth, if, as I believe, the doctrine of spontaneous generation is a myth."

During the siege of Paris and for some few years after, he returned to his fermentation studies, paying special attention to the diseases of beer, partly apparently with the patriotic idea of making the French independent of the Germans even in the matter of brewing.

We now come to the researches which are more nearly connected with the subject of medicine. In all his work up to this time, his ability to investigate the obscure phenomena of microbiology, was rendered always more possible on account of the constant perfecting of his methods.

His first attack was made upon a disease of cattle and sheep called anthrax or carbon, which yearly destroyed many thousand head in France alone.

The field was to a certain extent cleared by the observations of Davaine, who had first seen the minute anthrax bacillus in the blood of animals affected with the disease, and by the work of Robert Koch, then a practising physician in

a small German town, who had studied the conditions of spore formation in the anthrax bacillus and had practically settled the connection between the bacillus and the disease. As yet, however, Koch's methods were open to the objection that in inoculating an animal with anthrax blood, one not only inoculated with the bacillus but also with other substances in the blood which might be the true cause of the disease, the bacillus being only an accompanying phenomenon.

Pasteur, equipped with his knowledge of culture media, his technique of sterilization, was able to complete the final step in the etiology of anthrax by infecting a sterile solution of organic material with a drop of anthrax blood, and after observing the growth for several days, infecting a second solution with a minute drop of the first and so on until after many passages from one flask of culture medium to another, it was certain that the only thing still present was the bacillus which reproduced itself rapidly in every new flask into which it was introduced. A small quantity of this pure culture of the bacillus introduced into an animal produced the disease of anthrax and the chain was complete.

We have in the results of the labors of Koch and Pasteur upon this disease called anthrax the foundation of all our modern methods of bacteriological research, and as a consequence, all the knowledge recently acquired concerning infectious diseases.

These observations upon anthrax were followed by studies upon chicken cholera and several other bacterial diseases and in these studies he came upon a fact, the great significance of which he at once perceived. He found that the longer he grew his bacillus of chicken cholera upon beef broth the less virulent it became, that is the less apt it became to produce disease in an animal upon inoculation. He also found that an animal which had recovered from the effects of a dose of a non-virulent germ was not apt to contract the disease when inoculated with a more virulent culture. That is, a mild attack conferred an immunity which prevented a second attack. He of course had the observations upon Jennerian vaccination before him and he at once perceived what this meant. A further study showed him that it was the growth of the chicken cholera in the presence of oxygen which caused the loss of virulence and he immediately applied the method to the disease already mentioned, anthrax. But unfortunately the anthrax bacillus forms spores and these spores are a means of enabling the bacillus to withstand unfavorable conditions and so maintain its virulence. The question consequently resolved itself into a method of preventing spore formation.

With the assistance of Chamberland and others of his pupils he found a method of at the same time preventing spore formation and attenuating the virulence, viz., by cultivating the bacillus at a temperature several degrees above the optimum, etc. The optimum temperature for the growth of anthrax is at blood heat, i. e., 37° c. and when cultivated at 42° to 43° it was found that not only were no spores formed but that the virulence was weakened, and when brought back into broth at blood heat this condition was found to be permanent. He then had at his command an easy method of producing anthrax cultures of all degrees of virulence and it was a simple experiment to try the effects of inoculating animals with a series beginning with one of a low virulence and passing gradually to one of maximum virulence.

The experiment was made and was successful, sheep inoculated first with an anthrax of low virulence and secondly with one of greater virulence resisted a subsequent inoculation which proved fatal to an animal not so protected.

Pasteur at once suggested this as a practical method of protecting the flocks and herds of France from the disease which was carrying off thousands of them

yearly and it was suggested that if he were so certain of the results it would be well to give a public test and the public test was arranged for at Pouilly la Fort.

Roux who was one of his assistants at the time, has described this public test. He and Chamberland were away on holidays, when it was proposed and accepted and they received a telegram from the master to return at once. On their arrival he told them what he had agreed to, twenty-five sheep were to be vaccinated by his method, other twenty-five were to be left unvaccinated, all were to be publicly inoculated with a virulent culture of the anthrax bacillus. The protected sheep received their first vaccine May 5, 1881, and as Pasteur left the laboratory he called out gaily "Be careful and don't mix the flasks." On the 17th the second vaccination took place and on May 31st all the animals, vaccinated and unvaccinated, received their dose of virulent anthrax. Pasteur had perfect confidence in the outcome of the experiment until twenty-four hours before the close of the experiment when for a time he regretted his boldness in accepting the trial. But next day June 2nd he regained his confidence and went to the scene of the experiment quite calmly. The result was a perfect success: all the unvaccinated animals died of anthrax, the vaccinated ones were not even ill. A more complete vindication was impossible, and being so publicly made it naturally convinced the public at once and steps were taken to introduce the method in the districts in France in which anthrax existed.

It has now been carried on continually since 1881 not only in France but all over the world and the saving of cattle by its introduction has been enormous. In France alone during the twelve years succeeding its introduction the saving has been estimated at about 300,000 sheep and over 20,000 head of cattle.

The direct results in human medicine of this work of Pasteur's upon anthrax is the work which is being carried on in India at the present time by his pupil Haffkine in the prevention of Asiatic cholera by a similar inoculation with weakened virus. Haffkine's claims for the protection afforded against Asiatic cholera by his vaccination methods are now admitted by all those in India who have been in a position to follow his work. And if I may be permitted to prophesy a little I believe that some similar method will be adopted in that country for combatting the terrible disease now prevalent in Bombay, the bubonic plague.

There is only one other work of Pasteur that I wish to touch on to-day and that is the crowning work of his life, viz., his investigations upon rabies. He began this in 1881, and he carried it on continuously until at the meeting of the French Academy of Science on Oct. 26th, 1895, when he announced that he had successfully prevented the development of rabies in a boy who had been bitten badly on the face and hands and who certainly would have died of the disease if he had not been treated.

It is an interesting study to follow his papers through the *Comptes Rendus* of the academy and note the progress from time to time. How he recognized that the chief seat of the virus was in the nervous system, how he rendered certain the development of the disease in animals by intracranial inoculation, how the inoculation period became shorter, i. e., the virus more potent, as he passed it from one rabbit to another whilst it became longer, i. e., the virus weaker as he passed it through monkeys. How he finally noted that drying the brain and spinal cord of an animal dead of the disease weakened the virus and that a dose of the weakened virus conferred an immunity against the strong virus.

These investigations were especially difficult because no germ could be found, nor has it yet been found, although many observers have looked for it.

Not having found a germ it was impossible to isolate it and cultivate it outside the animal body. The whole question was beset by such technical difficulties that we are to-day not one step farther than we were the day Pasteur ceased his investigations. He found that the virus, whatever it was, resided in the nervous system and that the only method of cultivating it was in the living animal, that is by inoculating one animal from another, and to-day in Paris the vaccine which they are using for the treatment of rabies has been passing from animal to animal since Pasteur's experiments of 1881—1885. Every seven or eight days a new rabbit must be inoculated from one which has just died of rabies in order to keep the chain unbroken.

The important point in his observations was, however, the weakening effect of dry air upon the virus, and it is upon this fact that his treatment of rabies is based. Rabies produced by the saliva of a rabid dog inoculated by a bite takes a long time to develop in the system, say thirty to sixty or more days.

By using the virus contained in the spinal cord of rabbits which have died of the intensified rabies of the laboratory, death would occur in from eight to ten days. It is in the difference of the character of the virus and the difference in the incubation period that by protecting with laboratory virus of graded virulence it is possible to outstrip the virus introduced by the bite and produce immunity before this latter reaches the nervous system.

I can give you a better idea of this method of protective inoculation by simply repeating to you the method used in treating the first case, the boy Joseph Meister, bitten July 6th, 1885. The dose in each case was a portion of the dried cord of a rabbit which had died of rabies and which was rubbed up with sterile broth and introduced beneath the skin with a hypodermic syringe.

July 7th, in the morning, this boy received a dose of spinal cord which had been dried for fourteen days; the same afternoon he received one which had been dried for twelve days.

8th, A.M., one of 11 days.	12th, A.M., one of 5 days.
8th, P.M., " 9 "	13th, " " 4 "
9th, A.M., " 8 "	14th, " " 3 "
10th, " " 7 "	15th, " " 2 "
11th, " " 6 "	16th, " " 1 "

That is, on the last day of the treatment he inoculated this boy with a virus which, if he had not undergone the previous treatment, would surely have killed him in from ten to twenty days. Pasteur did not attempt this particular experiment without grave misgivings, and he watched it with terrible anxiety. His only reason for attempting it was the absolute assurance of the surgeons that the boy would die if not treated, and the fact that the experiment had been repeated many times on dogs and had always succeeded.

The result of the experiment aroused tremendous enthusiasm, and steps were at once taken to establish in Paris an anti-rabic institute which was finally completed in 1888, erected by public subscription and called the Pasteur Institute. In this institute up to the present day many thousand persons have been treated for rabies, and the mortality has dropped to under three per thousand. Similar institutes have been established all over the world.

The Pasteur Institute in Paris was not, however, erected solely for the treatment of rabies, it was also for the carrying on of all those investigations in the domain of micro-biology begun by Pasteur, and the results of the work done there

have appeared in the *Annals of the Institute* which is now in its tenth year of publication. In that publication we have many different papers, such as Roux and Yersin's work on diphtheria, Calmette's on snake venom, Metchnikoff's on anthrax and cholera and a host of researches, on vaccine and vaccination against these and other diseases, all showing the influence of the master's hand although his own personal work ceased shortly after the publication of his papers on rabies.

Pasteur died in September, 1895, and the grief of the French nation seemed almost extravagant, but he deserved all that was done for him during his life and all the respect that could be shown to his memory, for no son of France ever served her so unselfishly or so well. Pasteur's life and labors more than those of any man seem to point to the practical value of pure science. He asked only time and money to carry on his researches and he gave back freely the results. Not only France but the whole world to day is reaping the benefits. One is reminded of a sentence of Huxley's when he said, "I weigh my words when I say that if the nation could purchase a potential Watt, or Davy, or Faraday at the cost of a hundred thousand pounds down, he would be dirt cheap at the money." Nations do not purchase men like these by money down, they are a product of evolution, but one of the most important factors in this evolution is the liberal endowment of scientific research.

CHAPTER IV.

FORMIC ALDEHYDE AS A DISINFECTANT.*

Formic aldehyde, formaldehyde, or as it appears in commerce formaline or formol, is the aldehyde of methyl alcohol, and has the formula CH_2O . It is produced by a partial oxidation of methyl alcohol and occurs as a gas or in solution.

In 1888 Loew first called attention to the microbicidal character of this substance, and in 1891 Trillat patented the 40% solution under the name of Formolin, as a disinfectant.

The first to seriously study formaldehyde in this regard was Miquel, in 1894, who investigated its action thoroughly, both in solution and as a gas, and formed a very high opinion of its value. Since Miquel's paper a great amount of work has been done by various investigators, notably Cambies and Brochet, Trillat and Roux, Von Esmarch, Bosc, Kenyon and others. The most important fact about it was the disinfectant action of the compound in a gaseous form, and hygienists at once hoped that at last had been found the long looked for desideratum, a really valuable gaseous disinfectant. The method of manufacture of formaldehyde rendered it probable that it could be actually produced in a gaseous form in the room which was to be disinfected, and thus a simple method obtained which would be of general application. This method of manufacture is exceedingly simple, and depends upon the oxidation of the vapor of methyl alcohol by red hot platinum. In the manufacture of formaldehyde on a large scale the vapor of methyl alcohol mixed with air is conducted through a tube in which is placed platinum gauze which is heated at the beginning of the process to red heat. As soon as red heat is attained the oxidation begins on the surface of the platinum and the process continues, of itself, as long as the alcohol vapor continues to pass, the heat of oxidation being sufficient to maintain the platinum at the proper temperature.

Cambies and Brochet contrived a lamp, in which the alcohol vapor passed up through a cap of platinum gauze, which at the beginning of the process was heated to redness. This ensured a continuous supply of formaldehyde in a gaseous form which was thrown into the room, and the disinfecting power estimated in the amount of methyl alcohol which it was necessary to burn for a given cubic air space. The lamp was modified by other investigators, by substituting a perforated asbestos disc, which had previously had precipitated upon it, platinum in a fine state of division.

If this method had turned out practical, it would have been an ideal method of disinfection, but there are certain chemical facts which had to be reckoned with.

The first was that the process was one of oxidation and the amount of oxygen which mixed with the alcohol vapor had to be regulated carefully. If it were not sufficient too much methyl alcohol passed off unburnt and was wasted, if too great complete combustion took place and more or less CO_2 and H_2O was thrown into the room and consequently there was a similar waste of material.

Secondly, the formaldehyde gas diffused slowly and unevenly through the room, and consequently parts of the room did not receive enough of the vapor to insure disinfection.

* Prepared by J. J. Mackenzie, B.A.

Thirdly, formaldehyde has a tendency especially when moist to polymerize and form a compound of the formula $C^3 H_6 O^3$ which is quite inert.

It seems fairly certain now that, on account of these drawbacks, the lamp cannot be depended upon to produce thorough disinfection of a given cubic air space. At least not without too great a consumption of methyl alcohol.

It was then thought that it might be possible to use the commercial solution of formaldehyde in water (a 40% solution), and the first attempt was made by boiling the solution. This also gave uncertain results, and the formaldehyde showed here a special tendency to polymerize and become consequently inert. The important point is to have the formaldehyde gas thrown into a room in as dry a condition as possible, otherwise polymerization takes place.

To obtain this Roux and Trillat in 1896 constructed a formogenic autoclave, which had the following structure. It consisted of a chamber with capillary exit tube and manometer. The 40% solution of formaldehyde was placed in this together with 4% or 5% of chloride of calcium or some similar salt which had an attraction for water. This solution was heated in the closed chamber until the pressure reached 3 atmospheres and was then turned into the room through the tube. The pressure was maintained at between 2 and 3 atmospheres as long as the autoclave was acting.

According to Roux and Trillat this apparatus gave good results, producing complete disinfection in one case by the use of 3 litres for 370 c. m., i. e., about 0.23 litre for 1,000 c. feet. In another experiment on a room of 1,400 c. m. about 0.25 per 1,000 feet. Pfuhl obtained somewhat better results with the same apparatus, using under 0.2 litre per 1,000 cubic feet, but he found that one had to be careful to use a formaldehyde solution containing little methyl alcohol otherwise the combined heating and pressure caused a union of formaldehyde and methyl alcohol to form methylal, an inert substance and a consequent large loss in disinfecting value resulted.

Bose has objected to the use of the autoclave on account of the fact that even here one does not completely do away with polymerization, and when it occurs the polymer is apt to plug the exit tube and render necessary a stoppage of the whole process. He has consequently invented an apparatus by means of which the formaldehyde is thrown into the room dry and cold and no polymerization takes place; the important point in Bose's method is the form in which the solution of formaldehyde is used, as upon this depends the dryness of the vapor thrown out.

An important point in the whole question is the cost of the process.

Formaldehyde cannot be bought here for less than \$1.75 per litre, which would mean for 1,000 cubic feet a cost of say 44 cents, which is a rather high price if much cubic space has to be disinfected. This cost is, perhaps, rather high as formaldehyde has dropped considerably in price within the past few months.

In regard to the disinfecting action there is no doubt. It is very efficacious but superficial, and has the advantage of not in any way destroying fabrics. But it cannot be depended on to replace steam disinfection for bedding and mattress or in fact anything in which bacteria may be deeply imbedded in the folds.

A room after disinfection should remain closed for 24 hours so that the gas may have time to act.

There is no doubt, however, that the process is immensely superior to the ordinary SO_2 disinfection, although of course much more expensive.

CHAPTER V.

PROGRESS IN STATE MEDICINE DURING THE SEMI-DECADE OF 1892-1896.

At the outset of this report I stated it seemed proper at the end of the first half of the second decade of the work of the Provincial Board, that a *resume* of the advances made in public health work should be included in the Board's Report. Such a review resolves itself into the consideration of (a) Progress in the discovery of the causes of disease, (b) Progress in the methods of cure of disease, and (c) Progress in the prevention of disease.

1.—*Progress in the Discovery of the Causes of Disease.*—In 1882 it could hardly be said that the immediate cause of a single one of the contagious diseases affecting man was known. It was in that year that Prof. Koch gave to the world the results of his wonderful work in the discovery of the germ now generally known as bacillus tuberculosis. In 1886, Loeffler had, in the belief of many, discovered the true cause of diphtheria, but this may be considered to have been still in dispute for several years longer, obscured as it was with the question of the part played by several other germs in the production of exudations on the tonsils and pharynx.

The cause of typhoid fever was in 1891 already supposed to have been found in the germ now commonly spoken of as the Eberth bacillus. The work largely demonstrating the causation of cholera, which had been begun by Prof. Koch in 1884, during the epidemic of the disease in Toulon and Marseilles, had with the suppression of that epidemic largely lain in abeyance until the epidemic of 1892 in Hamburg, which made the subject one of such immediate importance as to draw the attention of many workers to it, and it may now be said that most of the principal facts regarding the conditions under which the comma bacillus develops a virulence, or loses it, as well as the conditions under which it exists external to the body are fairly well understood.

The cause of glanders, early investigated by Koch and others subsequent to 1882, has been generally accepted since the further work upon its bacillus has resulted in the production of mallein which is used with much success as a means of diagnosis.

With rabies, however, Pasteur had been able in 1885 to announce to the world that though he had not been able to isolate the germ of the disease, and while he was not in a position to say in what the immediate cause of the disease consisted, yet he could assert with confidence that he had developed a method by which he was able not only to effect with much certainty a cure in persons recently bitten by rabid animals, but that he was able to establish a complete immunity against inoculation of animals with the virus of the disease.

With regard to the disease known as actinomycosis, for some time prior to 1892, certain microscopic forms present in the little granules contained in the pus of abscesses in animals suffering from lump jaw, or what was known in England as "wens," had been found seemingly as a consistent accompaniment of the disease: but their true fungoid character had only at this time become known and their true relation to the causation and spread of the disease had been elucidated.

Such then in a general way was the position of our knowledge at the end of the first decade of the organization of the Provincial Board of Health, and it is interesting to compare just how far the knowledge possessed at that time has been extended in regard to the practical development under the other two heads, of the Cure and the Prevention of Disease.

Before referring to these it may be stated here, that during the last five years the true causes of tetanus, of septicæmia, of the plague or rinderpest, of the bubonic plague, and of several other animal diseases have been well established.

2.—*Progress in the Cure of Disease.*—In 1892, as has already been stated, our knowledge as to the causes of these several diseases was fairly well established. The relation, however, of the immediate cause to the disease, and more especially as to its action upon the individual attacked, cannot be said to have at that time been far advanced. It is true that already, years before, the fact that certain toxic products were associated with the process of fermentation and putrefaction had been very well proven: but it was not until Prof. Koch, in 1891, gave to the world the results of his investigations into the production of the by-product of the growth of pure cultures of bacillus tuberculosis, and the direct effect of the inoculation of this product named by him, "tuberculin," on the progress of the disease, that the world at large, scientific and non professional, was directed to his laboratory as the Mecca whence was to come salvation from the disease which had been the plague of civilized nations from the earliest known times until the present. It is true that tuberculin has not produced the results which its first advocates seem to have claimed for it: but it has, during the past five years, while teaching us its limitations, been the means of establishing very important theories as to the action of a class of by-products of the growth of bacilli, known as toxines, and of their action upon the physical organisms in the production of what are now known as anti-toxines. In 1891 and in the several following years, Prof. Behring was devoting himself intensely to the study of the by-products of the growth of the bacillus diphtheriæ, and also rapidly approaching the period of being able to state that while with the by-products of its growth separated by filtration from the germ, he was able to produce, when injected into animals in very minute amounts, fatal results with marvellous rapidity, yet by following up the practice of Pasteur in immunizing against rabies, he was enabled thereby to immunize animals, and therefore men, against even large doses of the toxin of diphtheria. The demonstration of this as a fact, as certain as that in the case of rabies by Pasteur in the previous decade, may be said to have been the greatest practical result obtained in this field of work during the past five years. Not alone in the case of diphtheria, however, has work in the direction of the anti-toxines proceeded. The immediate cause of tetanus, or lock jaw had already been discovered. Tizzoni and others have however been enabled to state that in spite of the extreme rapidity of the fatal results which show themselves after the onset of this disease they are able to combat with success the disease in horses, and to-day it is not an uncommon thing to see public reports in veterinary journals of animals cured of this disease by anti-toxine. This marvellous thing may be appreciated when it is understood that the poisonous substances need only be present in one part of the toxin to 300,000,000 parts of the body weight of the animal in order to produce a fatal result. Up to the time of the publication of the work of Yersin and Roux in 1891, the old difficulty as to what was to be called true diphtheria, and what was to be attributed to some less hurtful germ, had existed. Their work, since confirmed in hundreds of laboratories, has shown that, notably streptococci and diplococci, as well as some other forms, are quite capable

of causing membranous exudation in the throat. The difficulty (in practice) to separate these so as to make early diagnosis of the true character of the exudation possible has since then been quite removed, and diagnostic methods are well developed. As it had become a regular practice in the preceding ten years to diagnose tuberculosis by the presence of bacilli in the sputum, so during these five years it has become a routine practice in all advanced health departments to diagnose the true form pseudo-diphtherias, both as regards possibilities of treatment by anti-toxine, and for the full development of practical work for the prevention of the spread of the disease. While not of such immediate interest to us, yet it is equally interesting to observe that in another of Her Majesty's possessions where cholera is epidemic, and the bubonic plague from time to time epidemic, workers in this same field of science, of whom Haffkine must be considered the most renowned, are able to announce to the scientific world that immunizing against these diseases, and even their cure when promptly dealt with, is as certain as in the case of diphtheria in temperate climates.

With regard to septicæmia, that disease so sudden at times and so fatal in its manifestations, we seem to have found at last not only its cause in the streptococcus, but likewise are approaching the possibility of a cure by the cultivation of an anti-toxine. If as yet less permanent and less certain in its action than the anti-toxine of some other diseases, yet when it is remembered that the streptococcus is apparently the common cause of several types of this, at times most fatal, disease, the encouragement to labor until a final solution of the important problem has been achieved is such as to make the glory attached to his name, who is able to announce the certain discovery of its anti-toxine as a remedy, all the greater. Turning to the diseases affecting more directly both animals and men, we need only speak of tuberculosis as affecting both man and animals, especially cattle supplying milk and food, in order to arrest the attention of all concerned in the cure of this universally prevalent disease, which for years, though known to be present as a chronic disease in cattle, was but only recently suspected in its possible relationship to the disease in man. That congresses called to discuss tuberculosis, and tuberculosis alone, royal commissions appointed by Imperial Governments, bureaus of investigation, and state commissions in a dozen countries have all been investigating, and during these five years have universally reported the startling yet suspected fact, that the cause of the disease is the same in both man and animals, and that direct and positive dangers to the former constantly exist of the contraction of the disease from them, through the injection of the milk of cows, and the consumption of the meat of animals slaughtered for beef is a notable fact in this history of progress. Still more, when we have during these five years had demonstrated not only that the disease is the same in both man and animals, but also that it has further been possible to utilize the tuberculin of Koch as a diagnostic test of extreme delicacy of the presence of the disease in animals, which otherwise might seem perfectly healthy, we see the practical value of these experiments. The effects of this knowledge have been most widespread. Health authorities and agricultural authorities, have been enabled thereby to make the work of inspection of herds of cattle with a view to the diagnosis and stamping out of tuberculosis one of practical value, resulting in the well-grounded hope that we may shortly expect that the food supplies, whether milk and its products, or meat, shall be supplied to the public free, at any rate, of the the possible dangers which are now known to come from this source. Even though the progress be obtained along commercial rather than scientific lines, yet the results will be alone to the credit of the scientific labors of the discoverers both of the cause of the disease and its remedy.

3.—*Progress in the Prevention of Disease.*—Incidentally in discussing the progress in the discovery of the causes and the cures of disease, we have alluded to the progress in the work of their prevention. The routine procedure of prevention is doubtless better developed to-day in connection with diphtheria and tuberculosis than of any other of the diseases which we have to deal with. In tuberculosis it has become a routine proceeding to diagnose by means of the sputum early cases, not only in order that steps may be taken for the proper treatment of the patient, but that precautions may be adopted for the protection of other persons exposed to such cases. In the matter of diphtheria we are enabled so soon as the diagnosis has proven the disease to be real, to protect persons who have been exposed by prophylactic injection of the anti-toxin. This, indeed, is simply another illustration of the methods developed by Pasteur in his protective inoculations against rabies. During the last year the experiments of Widal and others have brought notably into prominence the diagnostic value of blood drawn from suspected cases of typhoid in its action on the bacillus typhosus, but it seems to have marked another positive advance in the possibility of serum treatment, as soon as the process of immunizing persons who have been exposed to the attack of this disease shall have been developed. From all we have learned at this distance Haffkine in India has been equally successful in his prophylactic inoculations against the bubonic plague. If Prof. Koch's most recent work on the rinderpest in South Africa proves all that is reported, then we have not only added another to the list of microbic diseases whose cause is known, but we have also the satisfaction of knowing that in addition to this the process of immunizing herds of cattle against the disease will soon be an accomplished fact.

In other fields of state medicine, such as those of disinfection, we have during this period advances to note, for if there is not so much progress to note, yet it is perhaps rather because there has not been so much room for development. The general application of steam as a disinfectant is now a recognized part of the work of every civic health department, and within the last year or two the progress of the means whereby the disinfection of rooms by some gaseous agency is effective, while not injurious to furnishings, has seemed almost realized in the application of formaldehyde. Its disinfecting qualities are positive, and if Bosc's very recent apparatus prove effective in supplying an unaltered dry gas we may then count upon having an agent both as regards effectiveness and cheapness which has long been a desideratum.

Progress, too, has been great in the field of water filtration, and notably in the application of mechanical filtration. While nothing has been reported which can supersede the use of sand filters, yet such progress in the improvement of the much cheaper mechanical filter has been noted that it is confidently hoped that with further study both of the conditions of the water and of the mechanical means for dealing with the several conditions, another five years will have put us into possession of means which, while having the stamp of scientific accuracy, will have the further merit of comparative cheapness. We have endeavored in a very imperfect manner to set forth some of the triumphs of preventive medicine during recent years, and to illustrate the fact as remarked by the venerable chairman of the Board in his annual address that medicine must now be placed amongst the exact sciences. At a time when we have almost daily the announcement of the discovery of some new method for utilizing the once hidden forces of nature, we have almost lost the ability to wonder. Indeed the danger increases of the public accepting all announcements of discoveries as facts, or at any rate of stamping all as of the same value. But the sources of life, both animal and vegetable, are

too mysterious and deep-hidden, as well as too intricate in their manifold relationships, to enable any isolated discovery to be independent of conditions which often notably modify the good results which at first are expected to naturally flow from it. The bringing forth of great discoveries is only through infinite pain, and the history of scientific progress is that of a pathway strewn with obstacles only to be surmounted by supreme endeavor.

It would be a worthy and profitable task to recall the labors, the failures and trials of our great men of science, in order that we might rejoice the more while contemplating the victories achieved, and gain courage for ourselves to make still more earnest efforts in the work of preventive medicine. But we may not here. Their names all will recall, as their memories all must revere. Of each of them, as Carlyle says of Goethe, we would say to ourselves, 'Colite talem virum,' "Learn of him, imitate, emulate him"!

P. H. BRYCE
Secretary.

PART II.



THE ANNUAL ADDRESS OF THE CHAIRMAN.

BY J. D. MACDONALD, M.D., HAMILTON.

Gentlemen of the Provincial Board of Health :

At this, the earliest opportunity offered by our meeting here, it is our first sad duty to advert to the removal from among us of our old friend and associate, Dr. Rae, of Oshawa, whose death took place so suddenly last May. He had been present with us at our stated meeting but a short time before, and manifested then no sign of ill-health, nor complained of anything, so that his death was to all of us a surprise. Although in our professional experience we are too well acquainted with such incidents, yet we must say that the loss of our friend came upon us like a bolt out of a clear sky. We shall miss his kindly presence as well as his wise advice, the latter the fruit of his long experience and observation. The Board sought to manifest its respect and its regret by proceeding to Oshawa, where it took part with the friends and fellow-citizens of Dr. Rae in the public and very largely attended funeral wherewith they honored his memory, and we now take this occasion to extend to the widow and family of our friend, our deep sympathy in their loss.

At this, the beginning of its duties of a new year, it is the privilege of the chair to express to his associates the usual compliments of the season. It may be said by some that these come a little late; but this is *our* new year; we are at the beginning of our work, and our mutual compliments consist in the hope and desire that our work may be continued, and that its usefulness may be made manifest—as indeed we have some confidence in saying that evidence of its usefulness has not been lacking. The advice of the Board has been sought on many occasions, by corporations, desirous of improving their sanitation, as well as by individuals seeking information on sanitary subjects, or improvement in surrounding conditions, and in attending to the various matters to which his attention was thus drawn, our good Secretary has had his time very fully occupied.

It is a source of thankfulness that the diffusion of sanitary information has had favourable results, and that as a consequence the condition of the public health has, on the whole, been favourable. It is true that we have not been without sickness, and that of a sort against which we, as sanitary officers, have to be, in an especial manner and degree, watchful, that is to say, sickness of an infectious nature, but such has been comparatively limited in extent, and mild in character for the most part.

It is not desired that it be assumed that the whole credit of this comparative immunity from suffering has been due to our sanitary precautions. There have been healthy seasons when there have been no sanitary Boards, and further, this community, and others elsewhere, have reason to rejoice over invaluable discoveries in the science of curative medicine—for the “*art of medicine*” has now surely advanced to the place of a “science.” But “prevention is better than cure,” and therefore sanitary science is losing none of its usefulness. The power which has been imparted to medicine, by which it procures immunity from some most serious ailments, as from smallpox by vaccination, and is able to abort others, as diphtheria, by the use of antitoxine injection, and rabies, by the same principle of treatment, cannot be too highly rated; but we have good reason to believe that the diligence of boards of health and the activity of their officers have had no little to do with the general healthfulness of the country for the

period covered by this address. Among the civilized communities it is admitted, that from the efforts of sanitary institutions, not only have infectious diseases generally been much brought under control, but that conditions are being understood, which properly observed, can wholly prevent the appearance of some of them, as for example, typhoid fever, diphtheria and Asiatic cholera. Diphtheria, that most distressing affection, which in the memory of some of us was so submissively accepted as a destroyer of child life, under the name of "croup." Certainly if the existence of sanitary institutions required any defence it is afforded by the contrast between the prevalence of those diseases as epidemics at the present day, and that of say, forty years ago, or even of a shorter time; a contrast which presents ample justification for the adoption of sanitary laws and for any curtailment of individual rights or even of personal liberty which the due execution of those laws may entail. There are still those who cry out against preventive agencies and who are disposed to resist their operation, but the general consensus seems to be coming to apprehend that these agencies are a necessity, and that the proverbial formula used near the beginning of this paragraph is to be regarded not merely as a sentimental aphorism, but as a well accepted practical article of belief.

Of the evil results of the neglect of means of prevention, we unhappily have had examples to add to the general experience during the latter months of this year. These have occurred in certain townships from which we have a story of suffering and fatality, and of remissness on the part of those whose duty it was to take measures for the public welfare, there having been in one, thirty cases of diphtheria, with five deaths, in one month, and from another, there having come complaints of "much suffering and many deaths."

These are mentioned to exemplify the insensibility prevailing in many places to the danger of infection, and to the very fatal consequences of that insensibility, and especially apparent in the rural districts where the people seem impressed more by the trials of poverty than with the danger of disease, as for example of that just mentioned, diphtheria, one of the most woful of them, but one which can be most surely stamped out by proper means for its prevention. Scarcely a case of it occurs which cannot be traced to its source, and which could not have been stopped at that source.

In cities and towns where from the many subjects ready for infection, prevention must naturally be more difficult than in the country, but where on the other hand, health officers are well organized and active, we have not heard of a general epidemic for a long time. In fact Toronto, with its large population, attributes its infectious diseases to importation by the return of its own citizens from the health resorts, whither they had betaken themselves away from the city during that summer heat.

It will probably take some time to impress this responsibility upon the dwellers in the poorer and more thinly settled districts, but it is the duty of all, especially of those engaged in sanitary work, to persevere in endeavor toward that end. We are sure of our facts. These are positive, and what has to be met in opposition are merely negative theories, such as the vain fancies of those who deny so vigorously the good results, or even the propriety of vaccination, but who have never given themselves the opportunity of observing its results, or who have never seen a case of small pox. But more difficult than to enlighten ignorance, is it to correct indifference. Indifference needs correction, and that which would be most effective is a substantial fine, levied on the municipality which neglects to take due measures against whatever infectious disease appears within its borders.

By request of the Board reports have been forwarded to it of the frequency and fatality of four principal infectious diseases. These reports can hardly be called complete "for six months." They cover only the period of five months; those for the last of the six months, that of December, not have been returned to the present time. A considerable proportion of the municipalities have made no returns, no doubt because they had a happy freedom from all ailments specified to them. Those ailments were typhoid fever, diphtheria, scarlatina and tuberculosis. Of those four, that which has been attended by the greatest mortality tuberculosis, having carried off nearly as many people as all the other put together; the deaths from tuberculosis having been 463 and from the other three 483.

Allowing for December the average of the five preceding months the deaths from typhoid fever during the second half of 1896 have been 268. This disease is thus the third in degree of mortality, being a little less than that from diphtheria, and a little more than half that from tuberculosis.

Water being the chief carrier of the typhoid germ and the necessary element of its life, we are not surprised when we hear of outbreaks of fever in localities which supply themselves with water from wells, for in settled communities wells are certain to become polluted sooner or later, but the malady has appeared in towns which have a water supply which cannot be suspected, as in those taking water from Lake Ontario at a considerable distance from the shore and safe from pollution. In the instance of an outbreak in such conditions our suspicions naturally fall on the milk supply of that town as being the source of the mischief. Wells in the country may become infected as well as those in towns. The neighborhoods of farms become infected by parties walking about and having diarrhea and not aware that they are the subject of typhoid. Proofs of the source of infection are by no means wanting. The amenity of our American brethren has supplied us with instances in their reports of 1896, with which they have kindly favored us, and for which we here beg to express our thanks. In one of those reports two examples are given of outbreaks in towns which were carefully traced to their origin and found to have had their commencement, one from a farm hand who had recently been discharged from an hospital where he had been confined with fever, and another to the pollution of a well which was favorably placed for contamination and was proved to have suffered it. One or two facts are worth very many expressions of opinion. The inhabitants of towns which become the seats of typhoid may take note of these two just cited, and may reflect that in making a milk test something more may be implied than a determination of the amount of butter-fat.

Ascribing to December the proportion of diphtheria which is reckoned to it of typhoid, we may say that the mortality from the former for six months has been 316. As has been already said, this mortality might have been in a great degree lessened if the health authorities of the infected districts had manifested a due sense of their duty and appreciation of the value of human life. The complaint has been that these authorities refused funds to provide for inspection and for isolation; but then it is possible that the sufferers and complainants may have been those who objected to the collection of the public resources for this and other purposes, and therefore it has been proposed to levy a fine on the municipality in the event of due care not having been manifested by it to check the advance of infectious disease as soon as it appeared within its borders. Scarlatina has been another of the infections of which a report has been sought. This malady, which has so commonly been followed by a very bad record, has given us, during the period reported, comparatively little trouble, or at least has inflicted little loss.

Seven deaths from it have occurred, four of them in the month of November, one in October, and two in July. It may have been that deaths were more frequent when house ventilation began to be obstructed because of the cold of the approaching winter in November.

The fourth disease is tuberculosis, the losses from which are, within a very little, as great as that from all the three others put together, manifesting itself for the most part in the form of consumption. The difficulty in dealing with it as we would with any of the other three is dependent on its insidious mode of approach. It is in possession of the citadels of life before signs of its presence are realized. How to advise acceptably with regard to it may tax to the utmost the resources of our authorities in science, and of our Boards of Health. No doubt isolation would be chiefly advantageous as a preventive measure if it would be consented to soon enough, but the advice to put it into practice would not be listened to in most instances, and very good reasons could be given for resistance. It would seem that while the health officer might be watchful, his direct interference would be unsuccessful if even at all tolerable to the sick party or to the relatives. Our best hopes of the general adoption of adequate protective measures against this malady rests on a better and more general information regarding its mode of origin and a loosening of the belief in its heredity.

It must be admitted that the history and course of tuberculosis is such as to favor the belief that it is an inheritance. Its early appearance in children in some of its forms, and its later appearance in the form of lung disease in members of the same family, seem to force that conviction, and the opinion has still a strong hold, not only on the public, but on the medical profession.

But due heed being given to the nature of the infecting agent and to the more common course of the phenomena of the disease, it may be apprehended that its prevalence is more easily explained by the theory of infection than by the supposition of inheritance, and that its appearance in families from generation to generation is due to family conditions and habits rather than to family inheritance, these conditions and habits affording opportunity to the infecting agent to establish itself in the organs of one member of the household after another.

These observations are to be offered to the Board with an apology. They are trite no doubt, but the large proportion which tuberculosis occupies in our bills of mortality seems to make it incumbent upon us to take every opportunity of urging upon the people and upon their health authorities that they give more attention to the information offered them on every side with reference to this destroyer of their families, and that they learn that in few, if any, instances is heredity responsible for it. The insidious way in which its first approaches are made and its common occurrence in both animals and men will perhaps always ensure it a place amongst us, but much may be done to limit its progress if not for its cure. The means for the latter result are not within the reach of all, but those for its prevention certainly are, and they are comprehended in one word, cleanliness, but that to a degree which is not as yet our ideal. Our cleanliness is mere dilution of an evil in air or water and that degree of it does not suffice for the removal of the cause of tuberculosis. There must be destruction of its agent by heat of fire or boiling water. If the sufferer of consumption lets his expectoration dry before he exposes it to that heat, he himself becomes an agent of infection for all his friends, and in a disease of slow course, such as consumption is, he is likely to be a source of infection for a long time, long enough to destroy the greater part of his family. Before bringing these remarks to a close it seems

well to revert to a subject which has been before the notice of the Board on a former occasion. I refer to sanitariums which serve the purposes of hospitals and retreats—in the one capacity aiming at the cure of the sufferer, in the other at prolonging life and contributing to its comfort, and in still another, and that quite as much to be desired as either of these foregoing, to the removal from a family of the infection which otherwise is extremely likely to prove fatal to many more of the members. Lately cure has come to be spoken of as having been brought about in the hospitals, and no doubt consumption undergoes an improvement equivalent to cure very often, although those may not have had the benefit of an hospital in the case: but we must remember that an abeyance of the symptoms is not a cure, and that before accepting the cure as being confirmed it will be well to wait for a *post mortem* examination. We are never surprised when we see a friend or neighbor who has given evidence of consumption in youth, and who seems to have recovered and enjoyed good health for years, fall a victim to phthisis at last. He has probably been a distributor of phthisis all the time, yet on the best authority cures take place, and according to credible reports certain associations for life assurance find it to their profit to send their members sick with phthisis to hospitals for the reception of consumptives and to pay for their residence there until they are cured. Those institutions thus risking money on the possibility of a cure are at least an evidence of conviction on the part of men of sagacity as well as of information that cures of well established cases of consumption are not infrequent, provided fit means are employed.

The Board has further had reason to despatch a committee of inquiry to a summer encampment on the border of Lake Ontario. A report had been sent that whooping cough had been prevalent there. The committee found that the affection had been there but found no cases existing at the time of its visit, and heard no sound of the characteristic cough during its examination of the locality for a whole day. It was found however that the disease had been there, children having come in the latter stages of their malady in the expectation that a residence at the encampment would effect a cure. The danger likely to accrue from the gathering together into one place of many cases of infectious diseases was explained to the superintendent of the encampment, and though the worthy official did not seem to be much impressed he undertook to prevent the residence in the locality of any others who might at any time show signs of the disease. No doubt the promise will be kept. It is to be recognized, however, that children who have passed safely through the first impetus of whooping cough must be allowed a change of residence to some open, airy place. Nothing conduces so much to their escape from prolonged danger from that affection.

II. QUARTERLY REPORTS OF THE COMMITTEE ON EPIDEMICS, INCLUDING

1. Report for Quarter ending October, 1896.
2. " " January, 1897.
3. Report on a Typhoid Outbreak in East Zorra.
4. " Whooping Cough at Grimsby Park.
5. " Diagnosis of Typhoid.
6. " Tuberculin Test in suspected cow in York Township ; also
7. " of French Academy of Medicine (1896) on the Diagnostic Value of Tuberculin
(translated).

1.—*Report of Committee on Epidemics for the Quarter Ending October, 1896.*

To the Chairman and Members of the Provincial Board of Health :

Your committee begs leave to report that during the past quarter, while the province has been remarkably free from epidemic diseases of the more infectious character, evidence has been brought to it, that as is common at this season of the year typhoid fever has been prevalent in many country districts, and indeed in those towns and cities where well water is still more or less used.

The absence of any epidemic due directly to a polluted public water supply is a most gratifying statement to be able to make of a province where over 100 public water supplies exist, and points yet more strongly to the wisdom of other towns and villages at once instituting works of a public character, if they are to maintain their healthfulness and commercial position.

Reports regarding outbreaks have been received from Keppel township also from the village of Bayfield, where typhoid prevalence illustrates once again the common mode of its propagation where the wells of a village are in a sandy soil on clay, and not more than 10-20 feet deep.

Local pollution from privy pits and manure heaps is as usual the assumed cause. The Board in this as in similar cases supplies sterilized bottles for samples and analyses them, and recommends closing of wells based on the result of analysis.

A report from the village of Islington, in Etobicoke, a place where for ten years similar cases have occurred, illustrates the same conditions and methods of propagation.

The existence of typhoid is reported from the lumbering district of Sault Ste. Marie, where the Mayor of the town complains that such men are sent out to the town for treatment from camps, and become a charge as paupers on the town. The need of an hospital in such a centre where the per capita grant of the Gov-

ernment would in some degree serve to recoup the town for such expenses is greatly required, and illustrates the need which the Board has before referred to for similar hospitals in the several town centres in the sparsely settled new districts.

The city of Belleville, as reported at a previous meeting, has been more than usually a sufferer from typhoid this year, and while there is public water it is not under the charge of the city, and is limited in its use with the result that old town wells from polluted springs are still in use in the main street, and wells similarly dangerous exist in other parts of the town. The town has been strongly urged by your Secretary to purchase the works and adopt filtration of the bay water such as is being carried out in Deseronto.

The disease is also reported as existing in Gravenhurst. A severe outbreak occurred among mill hands at Utterson in Muskoka, where the water supply used was with reason suspected, the condition of the cottages where the mill hands were forced to live being most unsanitary. Action was advised in the matter by correspondence.

Similar unsanitary conditions resulting in fever in the village of Warren, in Algoma District, are similarly reported, and the people urge this Board to give power to appoint a Local Board of Health. Such action as the Board can take is strongly advised.

A serious outbreak from the town of Renfrew is reported. Your Secretary has been aiding the Local Board to trace the cases, as usual, to wells by having bacteriological analyses made, which results will be reported upon by Mr. Mackenzie.

Diphtheria. During the summer this disease has been present only in very limited amounts in most districts, but during the last six weeks since the onset of damper weather, and the opening of the public schools, more cases have occurred, and antitoxin has to some extent been in demand. Owing, however, to supplies being kept by druggists in many towns, the Board has not any accurate idea of the extent to which it is being used.

Outbreaks have been reported from Whitney, in the unorganized territory in Renfrew, and membrane examinations have been made in cases as reported from Madoc, where it has broken out in the public school. Membrane examinations have been made in the Board's laboratory, also from Rawdon township. Within three weeks fifteen cases were reported from Watford, in Lambton county, and the Local Board have been advised as to the measures to be taken, and examination of membrane advised.

A dispute on the utilization of a school house in Minden during the holiday season as an hospital was reported, and action to be taken in the circumstances was advised.

A severe outbreak has occurred in Durham village, with a very considerable number of cases, and a notable number of deaths.

An outbreak has also been reported from Osprey township, near Durham, the Local Board seeking information and asking for supplies of literature.

The most recent and serious outbreak reported is that at present in St. Thomas. The circumstances attending it are now being investigated.

In connection with these outbreaks of disease, it is with much satisfaction that your Secretary can state the important assistance he has received from the

Registration Act, which requires monthly returns of deaths from contagious disease. These returns have been the first notice in several instances that we have received of the prevalence of these diseases, and he has thereby been enabled to take action through the Local Boards of Health for their limitation.

The following report of work done in the laboratory is submitted as a part of this report.

All of which is respectfully submitted.

P. H. BRYCE, M.D.

I (a).—*Laboratory Report for Quarter Ending October, 1896.*

BY J. J. MACKENZIE.

Mr. Chairman and Gentlemen :

During the preceding summer the laboratory has been called on to investigate many problems of a sanitary character in connection with the health of the Province.

Along certain lines there has been marked increase in the amount of work sent in ; along others the increase has not been so great as the importance of the work would lead us to expect. On the whole, however, the work has increased.

Water Analysis. A large number of samples of water from various parts of the Province have been examined bacteriologically. In all, from May 1st., 108 samples have been examined. In addition to these some 29 samples were sent in, but not examined on account of my absence from Toronto, either for holidays or on work for the Board. Thus, in all, about 135 samples of water were sent in for bacteriological examination.

These samples came from the following localities, viz., Brantford, Belleville, Guelph, Port Hope, Woodstock, Walkerton, Rockwood, East Zorra, Beaverton, Renfrew and Oshawa.

The number of samples sent in was more than all those received during the preceding year.

From the results of these bacteriological examinations it was possible to come to safe conclusions in a majority of the cases as to the potability of the water, whilst in some cases the results were doubtful.

As far as possible the quantitative examination of the number of colonies per c. c. present in a sample was amplified by a qualitative examination of the forms present, and especially by an examination for *bacillus coli communis*.

A record has been kept of the individual species of bacteria appearing in these waters, so that in time it is hoped that by a resumé of a large number of results, we may by a qualitative inspection come to some conclusion as to potability. So far, certain species have been noted as being practically universally present in all waters examined. For instance, there appears in practically every

sample of water examined, a form known as *B. punctatus* (Frankland), and in some cases it forms quite a percentage of the colonies present, and another form that is always found is that called *B. fluorescens liquefaciens*. These forms seem to be as common in European waters, and are likely world-wide in their distribution, and normally present in all natural waters. If a water is allowed to stand they are found to multiply rapidly.

On the other hand there are certain forms which are apt to be associated with polluted waters and when a sufficient number of observations have been collected no doubt we will have a valuable aid to the valuation of a water supply.

This spring there was published a new method for the isolation of the typhoid bacillus from water, called Elsner's method, depending upon the use of a special jelly containing potassium iodide which seems to inhibit the growth of all forms except *B. coli* and *B. typhosus*.

This method I have tried frequently during the past summer, but not yet with success. I found a tendency for many forms to develop from a water, from which, the originator of the method claimed, they would not grow in the jelly and of course the larger the number of species which grow in the jelly, the less likelihood is there of isolating the typhoid.

Latterly, however, I have modified the method somewhat with certainly the development in one case of a large number of colonies of *B. coli*, and I again have hopes that the method may lead to something. If it even gives us a quantitative method of estimating *B. coli*, it will be a decided step. I will be able to report more fully upon it at the end of the year.

Perhaps the most interesting series of bacteriological examinations are those in connection with the Brantford water supply. Samples of the public water supply and of private wells were sent to the laboratory every month.

The public supply shows the same purity as was found for it last year, and bacteriologically has practically remained the same throughout the summer in spite of marked variations in the water of the canal and river.

On the other hand the private wells were constantly worse than the public supply, some of them being exceptionally bad.

An important adjunct to the examination of the Brantford well waters was a determination of the chlorides, in which it was found that the purer the water, the more nearly it approached the chlorine of the city supply, the normal chlorine for the water-bearing strata beneath the town, being eight and ten parts per million.

The observations in regard to the impurity of Brantford wells have been reported practically for wells throughout the Province. There seems to be in all parts of the Province a very large number of very bad wells. In towns with a public water supply there are few wells with as good water as the public supply.

As a rule the bacteriological samples were sent to the laboratory so carefully packed that no material change in the number of bacteria in the water occurred.

This was when the instructions sent out by the Board were carefully followed. Occasionally this was not done and quite unreliable results obtained.

Chemical analyses were made of 19 samples of water, coming from Goderich, Stratford, Ingersoll, Woodstock, Deseronto, Hamilton, Brockville and Penetanguishene.

Examinations of Sputum. Examinations have been made of 43 samples of sputum since May 1st, with the following results: bacillus tuberculosis present in 28, absent in 15.

Examinations of Diphtheria exudate. Examinations have been made of 18 samples of suspected exudate with the following result: bacillus diphtheriæ present in 10 samples, absent in 8.

This department of the work has not increased as it should, as amongst the medical men sending in samples for examination there are very few new names. The same men continue to send month after month.

I would suggest in this connection that a new circular be sent out in regard to this work.

Other investigations. Two outbreaks of suspected anthrax were investigated during the preceding summer, and in both cases the post mortem reports led one to strongly suspect anthrax.

The first one was from Dr. J. Hugo Reid, of Guelph, which came in June 10th. Bacteriological examination by cultures and by the infection of animals, showed the anthrax bacillus to be absent.

On the 22nd, another sample was sent through Dr. Kitchen, of St. George. In this also, cultures and inoculations of animals proved anthrax to be absent. What the cause of these peculiar deaths in animals was is difficult to decide. In Dr. Reid's case there was isolated a bacillus of the *B. coli* group which was exceedingly pathogenic, but the suspicion was great that its presence was due to post mortem injection of the tissues. In Dr. Kitchen's case no specially pathogenic form was isolated.

Tuberculosis in Animals. There were four cases of tubercular tissue from animals sent in for diagnosis. A very interesting diphtheria case of a special character came to the laboratory on June 26th. This was the fauces and larynx from a girl who had died from mumps? under Christian Science treatment. The body had been buried about 14 days and had been embalmed before burial.

In spite of this, cultures of a bacillus believed to be Klebs Loeffler bacillus were made from the tonsils, and in order to make certain, two animals of the same weight were inoculated with the same dose of the bacillus, one however received 1 c.c. of antitoxic serum. The one which received the bacillus without the serum died in 48 hours with all the symptoms of laboratory diphtheria, the other was not ill and had not even a lump at the point of inoculation, conclusively proving the contention that the disease was diphtheria. It is also interesting as throwing light on the efficacy of embalming to prevent contagion.

Specific Typhoid reaction. At the Buffalo meeting of the American Public Health Association, Dr. Wyatt Johnston, of Montreal, called attention to a new diagnostic method for typhoid, discovered first by Prof. Pfeifer, of Berlin, and elaborated by Widal, of Paris, and Dr. Johnston himself.

This consists in a peculiar specific action of the blood serum of a typhoid patient upon the typhoid bacillus causing them to lose their mobility and run together into clumps.

Since returning from Buffalo, I have tried it in 60 cases, some of typhoid, some not typhoid, and have found the method confirm the clinical diagnosis in all except six cases. In three of these six cases it is possible that there is some other explanation than the failure of the test.

This test, if it proves to be what we expect from it, will be of importance in public health work, and will be another line along which the laboratory of the Board may be of assistance to the Medical Health Officer.

Already the Provincial Board of Montreal has sent out circulars to the medical men of the Province of Quebec, offering to examine blood samples from cases of typhoid, to assist in diagnosis.

Before closing I beg to call the attention of the Board to an important point and that is, the need of an assistant in the laboratory.

As I said above, 29 samples of water were spoilt on account of coming whilst I was absent, and a number of samples of diphtheria exudate could not be reported on for the same reason.

If the work of the Board is to go on increasing, some assistance must be given in the laboratory work, and I would suggest that the matter be seriously considered.

The work of the laboratory might be indefinitely extended and should be extended especially along chemical lines. Every laboratory of a similar character has a chemist as well as a bacteriologist, and if a chemist were appointed to your Board, his time could be kept fully occupied not only with the systematic examination of public water supplies already in use, but also with other chemical work which might be taken hold of. In addition to this, he could attend to any routine bacteriological work which might come in during by absence.

I would earnestly suggest the consideration of this matter.

Respectfully submitted,

(Signed.) JOHN MACKENZIE.

2. *Quarterly Report of the Committee on Epidemics for Quarter Ending January 31st, 1897.*

To the Chairman and Members of the Provincial Board of Health :

GENTLEMEN,—Your committee begs to report that the public health of the province during the past quarter has continued as a whole most excellent. There has been no case of smallpox reported, and the winter thus far has been free from any widespread presence of la grippe, which has, during the past seven years at this season, at times existed with very fatal results.

Diphtheria. There have been, however, outbreaks of diphtheria reported from many districts, which, except in a few instances, have been of limited character, and have been dealt with, with increasing promptness and thoroughness by the Local Boards of Health. The following table prepared from the monthly

disease reports, which it is gratifying to note have been made with increasing regularity, shows by counties the death returns for November, December and January to date.

No. of municipalities.	—	Total deaths reported.	Population reporting.
559	November	197	1,467,657
331	December	263	1,546,598
	(Up to 5th) January	193	1,262,604

—	Total municipalities reporting.	Total population.	Total deaths.
November	503	1,467,657	70
December	559	1,546,598	89
January	487	1,442,989	66

As has been before pointed out, the monthly returns are proving of the greatest assistance in supplying information on which this Board may take action in aiding and directing Local Boards in dealing with these outbreaks.

Correspondence of this character has taken place in connection with these outbreaks in Pelham township, Bertie township, Osprey township, Alfred township, Harwich township, Fitzroy township, Medora and Wood townships, Maynooth township, Sunnidale township, Toronto township, Keene, Harvey township, Nottawasaga township, Innisfil, Minden, Stanhope, Galway and adjoining townships; also in the following cities, towns and villages: Merrickville, Bothwell, Belleville, Blenheim, Madoc, Petrolea, Watford, Simcoe, Carleton Place, Delhi, Port Credit, St. Thomas, Collingwood, Southampton and Paris. Of these the outbreak reported upon at the last meeting as being present in St. Thomas must be considered the most serious. Apparently nearly suppressed in December, it is regrettable that the return for January reports five deaths.

The outbreak which has been reported from several frontier municipalities as having been traced to men infected with the disease, leaving for their homes from the lumber camps in the Algonquin Park districts, has been most remarkable, as illustrating at once the ready transmissibility and extreme contagiousness of even mild cases of diphtheria in strong men, to children who have contracted the disease in many cases with fatal results. The following table of cases, dates and municipalities invaded, collated from correspondence, illustrates too fully unfortunately the above statement:

RIDOUT TOWNSHIP.

Dr. Bridgeland (Bracebridge).

Oct. 25th.—Telegram to go to Dorset.

Oct. 29th.—Report on Dorset cases Earnest Isles reached Dorset from Gilmour's camp, in Hunter Township; stayed in village over night; very ill; was diagnosed in Huntsville Hospital as diphtheria. Ashley Henderson, companion of Isles, sickened a few days after arrival at Dorset; called diphtheria by Dr. Hart.

Oct. 29th.—A. Henderson's child sickened (died), other Henderson child exposed.

McLellan family, two cases, boy of 15 who lived at hotel where Isles stayed; boy waited on Isles.

Telegram—(Twelve children in family, more cases expected). Dr. Hart saw these cases.

Oct. 30th.—Another case reported from Dorset.

Nov. 9th.—Thinks Isles knew he had diphtheria.

W. N. Brown, Sec'y L. B. H. McLean and Ridout Townships (Baysville).

Nov. 5th.—Replies to telegram *re* taking charge of cases. Refers to Henderson and McLellan cases.

Dr. J. W. Hart (Huntsville).

Nov. 5th.—Refers to cases at Dorset (McLellan). Received Isles into his hospital.

MINDEN TOWNSHIP.

Dr. Chas. D. Curry (Minden).

Nov. 10th.—Specimen sent to Mackenzie. One hundred and twenty men reported in the camps.

Nov. 13th.—Mackenzie found bacilli in membrane from camp case.

Dec. 7th.—Card stating specimen sent from case from Gilmour camp.

Dec. 26th.—One hundred and twenty been in early part of season in camp intended for 60. Some men had to sleep in open air, others in stables, even then camp crowded. (Information from men, a large addition since been built). Statement that parties from Minden introduced disease to camp is incorrect.

A year ago cases in West Millford, 25 miles away, stamped out. January, 1896, Robson cases; June 11th, Reynold's cases, Hubert's cases. From these no communication with camps.

Davey School cases, originated in a railway camp (now used by Gilmour Co.) No cases spread from these, and no cases of diphtheria, follicular tonsilitis, or sore throat, which latter he sees but rarely except in men from Gilmour's camps first sent out in November.

Gault's camp, Cummings occupied this as boarding house; complaints made regarding several houses by Mr. Simpson.

W. S. Morrison, Sec. Board of Health (Minden).

Dec. 2nd.—Four cases lately in township; one child died; caught from uncle who came home when getting better. Men very crowded; camps filthy.

STANDHOPE TOWNSHIP.

W. Cooper (Boskung).

Dec. 24th.—Demands that all traffic between camps and Standhope be stopped, as camps are polluted with diphtheria. We know of several cases which have broken out. A later letter recites these cases; are mentioned in other correspondence.

Dr. Chas. D. Curry.

Dec. 26th.—Some cases in Snowdon Township, name illegible. Some cases in Lutterworth Township last winter or early spring.

Cases from camps coming under his own observation.

1. Henderson (Dorset).—Henderson suffering from sequelae.
2. Tyrill (Dorset).—He and Louck's had been in Gunter's camp.
3. Henderson's younger brother died of the disease. Tyrill was a mild case.

Date of visits.

4. Loucks—Nov. 4th and 5th.—Loucks not sick, was convalescent.
5. Alf. Little—Nov. 11th.—Came from Gault's camp to my office. He stated there were a number of cases of sore throat in camps at that time. Case verified by Mackenzie.
6. Burton—end of Nov.—Came from Hickey's camp suffering from sore throat. He communicated disease to nephew.
7. Burton's nephew.—(Died). Saw neither case; was in Toronto.
8. Reynold's boys—Nov.—(3) came here, (1) from Crosby's camp, (2) from Hickey's camp; had sore throats.

ANSON TOWNSHIP.

9. Reynold's sister.—I saw this case, so marked that bacteriological examination not necessary.
 10. Reid Goldie—Dec. 15th.—Came direct from Gault's camp. He knew of no other cases in camp at that time. Mackenzie confirmed diagnosis.
- These are all the cases under personal observation, but they are sufficient to show the state of the camps. All the men had been in camp from three weeks to two months.

OTTAWA AND WHITNEY.

Notices Gartshore cases.

11. Frank Gartshore.—took ill and recovered.
12. Ed. Gartshore.—Took ill; took train to Ottawa and died in hospital. (Statement made to Dr. Curry by father, also newspaper statement).

MONMOUTH TOWNSHIP.

13. Kinney, Hotspur P. O.
14. One child dead from this Kinney case.
15. One child dead from this Kinney case.
16. Mother not expected to recover.
17. Am informed by one man that thirteen men were off work in Crosby's camp at one time on account of sore throat.

Chas. H. Roberts, Reeve of Monmouth.

Dec. 7th.—(Nos. 13, 14, 15, 16). Reports Mrs. Attwell and her children died in summer from diphtheria. (Cost township \$200). Kinney came from Gilmour's camp with sore throat; two of his sister's children died with diphtheria. Mrs. Crighton had three cases of diphtheria, not from camp, but from Maynooth, in summer.

Dr. Robertson (Whitney).

Nov. 22nd.—Writes that an epidemic of sore throat is reported from Gilmour's camps.

18. Man came to see him about Nov. 20th; case referred to by Dr. Curry; looked like diphtheria. Whitney camps had been free from sore throat for some time.

Dec. 10th.—Reports result of inspection of camps around Canoe Lake; visited nine camps; two men sick; two cases tonsillitis; camps large and well ventilated in most instances; gave instructions in two instances; too many men in camps; over ninety in some.

GALWAY TOWNSHIP.

J. R. Stratton, M. P. P.

Dec. 14th.—Reports complaint of Father Nolan, of Fenelon Falls.

Father Nolan (Fenelon Falls).

Dec. 17th.—States two or three deaths to have occurred. Deaths were from sore throat; funeral not public.

19. John Cain came from Gilmour's camps; address, Kinmount.
20. Sister of John Cain (dead); address, Kinmount.
21. John Coffee (son of Widow Coffee).

M. Mansfield, Reeve of Galway (Kinmount P. O.)

Dec. 19th.—Dr. Frost stated positively that cause of case that died was not diphtheria.

Nov. 28th—Cain and Coffee arrived in Kinmount. Dr. Frost informed Mansfield he treated the two men for ulcerated sore throat. Coffee went back to camp after a fortnight.

Dr. Frost (Kinmount).

Dec. 24th.—Cain and Coffee seen Nov. 28th. Both had inflammation of the throat, with catarrhal exudations of fauces. Coffee not seen again; went out hunting I understand. Cain delicate, made slow progress.

22. Girl (Cain) sent for to see her on Dec. 7th; 11 years old; died.
23. Second sister, all with exudation on tonsils; ordered private funeral.
24. Third sister, all with exudation on tonsils; ordered private funeral.

Statement by aunt that her children had been sick six weeks before; all had it and all got better. School closed, as I believed the trouble contagious.

25. Had seen a man at Dorset who had come from camp with true diphtheria.

(Other cases in township of Craig, and a boy died; seen on 17th; later diagnosed as pneumonia).

The contagiousness of the disease under such conditions as commonly exist in lumber camps owing to the lack of good sanitary conditions, but especially to the limited air space supplied per capita to the men in the shanties, demands that the Board promptly recommend that such legislation or regulations under the Health Act be made requiring definite action on the part of companies, whether engaged in lumbering or mining, in the unorganized parts of the province be taken.

SUMMARY OF REPORT

(Superintendent of Algonquin Park, of the

Date of inspection.	Name and site of camp.	Number of men in October, November and December.	Condition of camp.	Source of water supply.
1896. December 8.....	The mill and camps, Canoe Lake.	October, 205; November, 112; December, 110.	Fair; closets on pit system.	Wells at present; soon to be taken from lake.
December 8.....	James Gault's camp, lot 20, con. 14, Peck Tp.	October, 31; November, 42.	Poor wash sink in sleeping room; water runs under the floor; piles of manure near shanty.	Potter Creek
December 8.....	Chas. Miron's camp, lot 18, con. 4, Hunter.	October, 80; December, 81.	Garbage pile 40 feet from sleeping shanty.	Potter Creek; poor quality, peculiar taste, probably due to jams causing dead water in lake.
December 9.....	John Sheridan camp, lot 25, con. 7, Hunter, Bear Lake.	October, 75; December, 60.	Garbage pile 25 feet from shanty; no drain for foul matter.	Bear Lake; good ..
December 9.....	P. Collins' camp, lot 12, con. 7, Hunter.	October, 75; December, 62.	No drain for slops ..	Water good from creek.
December 10.....	A. Airhart's camp, lot 15, con. 4, Peck.	October, 62; December, 68.	Fair drainage around camp; slops thrown on ground.	Water good
December 10.....	Samuel Gunther's camp, lot 23, con. 4, Hunter.	October, 125; November, 125; December, 97.	Slops emptied into creek; privies for men.	Water good from creek.
December 11.....	E. Cassibos' camp, lot 27, con. 4, Hunter.	October, 74; December, 84.	Slops thrown 30 feet in front of shanty; camp looks clean.	Bear Creek; water good.
December 11..... " 12.....	Wm. Crosby's camp, lot 32, con. 2, Hunter.	October, 110; November, 84; December, 65.	Closet very filthy, cause, must have been overcrowded in October.	Island Lake; water good.
December 12.....	James Hickey's, lot 26, con. 1, Hunter.	October, 103; December, 89.	Swept out as usual; bunks over and beside potato bin; slops thrown short way from door.	Joe Lake; water peculiar taste.
	Thompson's & Grant's, lot 22, con. 13, Peck, outlet of Joe Lake run in connection with camp.	October, 30; December, 20; total in October, 970; total in December, 778.	Clean and in good order.	Joe Lake; water peculiar taste.

OF J. SIMPSON, ESQ.,

Camps of the Gilmour Co. within the Park).

No. of cubic feet of air space per capita in sleeping room.	Number of men sick in October, November and December.	Nature of disease.	How many have left camps.	Where gone.
.....	.....	.....	Men left mill, no work.	Home.
248	October, 21; December, 1.	Sore throat	2 sick	Minden.
156 and 444	December, 1.....	Sore throat	2 with cut feet.....	Clare settlement.
162	December, 1	Rheumatism.	1	Huntingdon.
141	December, 1.....	Foot cut.....	1	Huntsville. Dr. Robertson did not visit this camp.
118 .....	.....	.....	1 injured	Marmora. Dr. R. did not visit this camp.
124 and 115	October, 2; November, 1; December, 1.	Diphtheria, sore throat, pleurisy.	2; 1; in camp.....	Huntville District, Calbogie Lake.
97	October and November, 1; December, 1.	Severe cold, inflammation of bowels.	1; in camp	Home.
136 in December, less in October.	October 5; November, 5.	1, sore throat; 1, la grippe; 1, injured; 2, unknown. 1 diphtheria; 1, unknown; 1, cold; 1, impure blood.	October, 8; November, 4; December, 17; several of sickness.	Huntsville, Coe Hill, balance unknown, Ottawa, Hospital, Dr. Howland's Hospital, home, Minden, Dr. Howland's Hospital.
123 and 182	October, 1; November, 1; December, 4.	Unknown; 3, sore throat; injury.	In camp; in camp; 1, 3; 7; 2.	1, Queensboro; 2, Bancroft; Stirling, rest unknown, Minden.
276 .....	.....	Little or no sickness.	.....	.....
.....	47 sick in all.	.....	49 left camp sick.	.....

In connection with all outbreaks of diphtheria, whose extent and persistence have made investigation necessary, the following conclusions are equally applicable :—

First. The type of the disease in pleasant weather in the early autumn was often mild, and first cases have either not been diagnosed, or if diagnosed, not reported ;

Second. That in every district it has been found either that some physician has certified that infection no longer exists in a house, and the patient has been allowed to mingle with the general public, or to the Medical Officer either not being notified, he considering he has no power under the Act to prevent this mingling with the public until the usual period of isolation, generally recognized as necessary, has elapsed, or until a bacteriological culture of the throat mucus has been found free from the presence of diphtheria bacilli ;

Third. The lack of efficient organization of Local Boards, and especially of their having a medical officer so paid and supplied with facilities as to enable him to efficiently supervise cases, and especially maintain isolation and subsequent disinfection of premises. These conclusions after an experience under the present law for thirteen years, emphasize the urgent need for devising some scheme whereby a centrally located county medical officer can aid by laboratory investigations in the early diagnosis of mild cases, and the subsequent determination of the presence or absence of contagion where convalescence has advanced.

Scarlatina. The monthly reports indicate that in several municipalities scarlatina has shown a more than average prevalence during the quarter. Fortunately the outbreaks have been generally mild.

The type of disease is illustrated by the Toronto returns where of 100 cases reported, and other slight cases probably not receiving medical aid, but three (3) deaths have occurred in January, or not more than three per cent. of all cases. That the disease is liable in severe weather, such as may occur in February and March, to assume a severe type, may be seen from the unfortunate outbreak reported from Toronto township :

1st family,	3 cases—	1 fatal,	1 very serious,	1 mild.
2nd “	2 “	1 “	1 “	1 “
3rd “	4 “	1 serious,	3 slight.	
4th “	1 “		1 slight.	
5th “	1 “	average.		

These mild cases which, however, maintain their infectiousness often for forty or more days, and as in the case of smallpox, the scales remaining on clothes, make the infectiveness a very serious feature. The necessity for long absence from school of the members of such families, and careful disinfection of clothing, demands the most serious attention of Local Boards and their officers.

Typhoid. The past quarter has as usual seen a decline in the prevalence of this autumnal disease. There have been, however, several localized outbreaks in rural districts, which, as that investigated by the Board in October in East Zorra, have illustrated a remarkable virulence, and have forced the Board's officers to again carefully review the too prevalent belief that the disease is not directly contagious. The outbreak in the McCullough district of Eramosa, like that of East Zorra, has been of this character. Reference to the particulars on this point will be found in the special report on the East Zorra outbreak.

It is most satisfactory to note that, excepting the water supply of Windsor, there is no public water supply in Ontario to which suspicion of sewage pollution can at present attach. The disease has almost universally in this Province been shown to be primarily connected with pollution of well water, and the number of examinations of suspected well water, from the laboratory statement appended to this report illustrates how physicians and the public generally now at once direct their enquiries to the condition of their wells.

Special correspondence bearing upon these outbreaks has been had with Sault Ste. Marie, *re* cases from the lumber camps, from Eramosa, from Utterson, from Gore Bay, from Bayfield, from Renfrew, from Newtonville, and from Mitchell.

Your committee reports with regret the death of Dr. George Mackenzie M. H. O., of Essex, who died during the quarter a victim of this disease.

Hydrophobia. The quarter has witnessed one of those remarkable outbreaks of hydrophobia, so mysterious as to their first causation, which during the past six years have from time to time come to the notice of this Board. The particulars of the Paris outbreak and of other outbreaks will be reported upon in the quarterly laboratory report of Mr. Mackenzie. The promptness of action taken by the Local Board and medical officer of Paris, on consultation with this Board, had the gratifying result which has followed in every instance during the past six years in which the Pasteur treatment of acute rabietic inoculations has been practised. With other worshippers at his shrine this Board lays with the world of workers in pure science, through its English confrères, its wreath of immortelles upon the tomb of him who now reposes in the splendid mausoleum of the Pasteur Institute, erected not more as a recognition of his gifts to humanity than as a source whence may continue to flow blessings upon the race of men and animals as well.

Animal Diseases. The quarter has been notable, as having seen the Board's efforts successful in obtaining such an Act and regulations made under it as will, it is trusted, speedily place the whole work of inspection of dairy cattle and abattoir inspection in the Province on an advanced and satisfactory basis.

Brockville has been the first to establish a routine of inspection of dairy cattle by the tuberculin test. Toronto is now preparing regulations to the same end. Woodstock is, it is understood, about to adopt similar regulations, and it is strongly to be hoped that before the year is out similar action will be taken by all our cities and large towns.

The interest attached to this work is very remarkable and numerous communications, especially from veterinarians, indicate that everywhere there is need for active steps being taken in this matter. Such correspondence is herewith submitted.

The notable progress made in the work of general cattle inspection in the several States of the United States, and especially by the systematic abattoir and cattle-yard inspection by the Federal Government staff, whereby 35,917,479 animals were inspected in nine months of 1896, and in which 89,399 cattle were condemned, shows very fully that there is the same need for Local Boards of Health in Ontario, through the veterinary inspector, to maintain a similar close supervision over animals as over men.

Isolation Hospitals. This subject has again been brought to the attention of the Board during the quarter, owing to the several outbreaks in the unorgan-

ized districts of the Province and the claims made by several municipalities for compensation for the care of indigents from the unorganized parts. Notably is this true in the localities where there are numerous lumber camps.

Sault Ste. Marie is now preparing plans and raising subscriptions for an hospital, and the question of pushing to completion the scheme for an hospital at Port Arthur has again been brought forward, owing to cases of smallpox having been carried past quarantine to Winnipeg. The question whereby frontier organized municipalities may both be protected against the introduction of contagious disease and the expense of supplying hospital aid and medical treatment to patients for the unorganized territories, must again be submitted by your committee with the hope that some definite plans of dealing with such through legislation may be arrived at.

Submitting their report with its recommendations for the Board's consideration.

Your committee have the honor to be,

P. H. BRYCE,
J. D. MACDONALD.
C. W. COVERNTON,
J. J. CASSIDY.

3.—*Report Re Typhoid Outbreak in Zorra Township.*

TORONTO, November 12th, 1896.

DR. P. H. BRYCE,

Secretary of the Provincial Board of Health :

DEAR SIR,—Acting under your instructions, I went on October 1st to Innerkip, to investigate the outbreak of typhoid in East Zorra.

This outbreak was purely a local country epidemic, but presented characters of such severity as to lead the local physicians to believe that circumstances of a peculiar character must be present to account for it.

Dr. Hotson, the health officer of the township, took me to the houses and gave me all the assistance in his power. After spending the afternoon in inspecting and taking samples of water, I proceeded to Woodstock, where I called upon the physicians attending the cases. These gentlemen, Drs. West, Murray, and Clement, kindly assisted me in every way to get at the facts of the epidemic.

The facts are as follows: David Pallister, farmer, of East Zorra, living at the house marked "Pallister House" in the plan, suffered on August 8th from what was supposed to be a slight sunstroke. He was shingling all day (a very hot day) and was taken ill in the evening. He was unwell for the next three weeks, but did not take to his bed. On August 25th he became seriously ill, went to bed, and his attending physician pronounced his disease typhoid. He died on September 2nd, the most marked feature of his case being the severe and uncontrollable hemorrhage of the bowels.

On August 19th Mrs. Robert Walton, sister of David Pallister, and living in the Walton house, was taken ill with what was at first thought to be malaria, but finally proved to be typical typhoid. She had suffered from tubercular

disease of the lungs for some time. She recovered from the typhoid but succumbed to the lung trouble on September 12th. Two children of Mrs. Robert Walton were taken ill with typhoid August 21st. The disease ran a mild course and they recovered.

On September 3rd and 4th two daughters of David Pallister, living in the Pallister house, developed the disease, and died September 11th and 12th. Severe intestinal hemorrhage was a marked feature in both cases.

September 3rd. Harry Bonall, a young farmer, living in the Bonall house, and a constant visitor at the Pallister house during the sickness of David Pallister, was taken ill with typhoid, and died September 24th. Intestinal hemorrhage occurred in this case in the third week.

September 7th. James Hallock, living across the road from the Pallister house, took the disease. He assisted in some of the nursing of David Pallister, and shaved him the Sunday before his death. He died September 21st, with perforation of the bowels.

September 6th. William Pallister, a brother of David Pallister, and living in the Pallister house, took the disease, and died September 16th.

September 14th. Mrs. Walton's eldest daughter took the disease.

September 17th. David Pallister, jr., who had been away from home, but who returned at the time of his father's death, took typhoid.

September 21st. Another child of Mrs. Walton took typhoid.

September 21st. A little child, brother of Harry Bonall, took the disease.

September 20th. The father of Harry Bonall took the disease and died about October 8th.

September 25th. Charles Hallock, brother of James Hallock, and Joseph Moserip, both living in the Hallock House, took typhoid and were removed to the hospital at Woodstock.

September 26th. Charles Walton, a nephew of the Robert Walton, took typhoid. He had visited the Walton and Pallister houses during the epidemic.

Finally, another case, Arthur Thomson, living some distance from the Pallisters' and Waltons', took typhoid September 15th, but this case is only doubtfully referable to the others, as there was a possibility that it had been contracted in Toronto.

The chief clinical feature of these cases was the severity of the intestinal lesions, resulting, in the majority of the fatal cases, in severe and uncontrollable hemorrhage, and in one case in perforation. There was a marked absence of delirium. Another feature was the rapidity with which putrefaction set in. In no case was an autopsy held.

Upon looking at the sequence of these cases it will be seen that the primary centre was either in the Walton or Pallister houses. The difficulty is to decide whether Mrs. Walton or David Pallister was first infected; after the disease established itself in the Pallister house it certainly proved the centre from which the Hallock and Bonall cases arose. I am inclined to believe that we must look at the Pallister household as the primary centre for the following reasons:—

1st. All the members of the family (five) save one, developed the disease. In all it was exceedingly rapid in its course to a fatal termination except in the case of David Pallister, jr., who was at once removed to the hospital at Woodstock. The one member of the family, Eugenia, a daughter, who did not take the disease, stood the whole strain of nursing, but she has a history of a severe typhoid a year before.

2nd. David Pallister contracted the disease on his return home, with about the usual period of incubation of two weeks between exposure to infection and development of symptoms.

3rd. The two cases, James Hallock and Harry Bonall, evidently receiving the infection directly at the Pallisters' house, were equally severe with the Pallister cases.

The cases, consequently, may be tabulated thus:

Primary—David Pallister,		fatal.
Two Pallister daughters,		"
Wm. Pallister,		"
James Hallock,		"
Harry Bonall,		"
Mrs. Robert Walton,		"
David Pallister, Jr.,	not	"
Secondary—Robert Bonall,		"
Bonall child,	not	fatal.
Chas. Hallock,	"	"
Joseph Muscrip,	"	"
Walton children (4)	one	"
Chas. Walton,	not	"

On this hypothesis, the disease, as it spread to the Bonall and Hallock households, lost its virulent character.

There is, however, just this objection, that the Walton house, as will be seen by the description, was in an unsanitary condition, and the Walton well was very bad indeed. In addition to this two of the Walton children (one afterwards fatal), Chas. Hallock, Joseph Muscrip and Robert Bonall (fatal), were all removed to the Woodstock hospital, as was also David Pallister, and it may be claimed that the favorable outcome of these cases was due to the better attention which they received in the hospital.

In regard to the relationship of the Pallister and Walton cases, the communications of the family were most intimate, and it was quite impossible to find out anything which would throw any light upon the relative frequency with which the members of one household visited the other.

The disease was so severe in all these cases that a doubt arose in the lay mind as to whether the cases were typhoid or not. The clinical features were so characteristic that the medical attendants had no doubt as to its being typhoid.

When in Woodstock, however, I took samples of blood from the two Walton girls, from Chas. Hallock, Joseph Muscrip and David Pallister, and at East Zorra a sample from Robert Bonall. The blood of all, except Robert Bonall, showed marked agglutination action upon the typhoid bacillus within twenty minutes in hanging drop cultures. The blood of Robert Bonall did not give the reaction, but that may possibly be due to the fact that I only obtained a very small drop of blood from him. There seems no reason to doubt that all these cases were genuine typhoid.

Before considering the method of communication and origin, it will be well to give a description of the premises and the results of the examination of the wells.

The house consists of a frame storey and a half-house with a cellar underneath. The house was locked so that I could not get in, but Dr. Hotson tells me the cellar is dry, with an earthen floor. The house stands in the middle of a

large orchard. Back of the house and separate from it by an open passage of about five feet in width is the remains of a former log house. This was still used as a kitchen and milk-house, and is partially divided into rooms, but the walls are incomplete, and there is free exposure of one room to the others, and of all to the outside.

South of the dwelling house and immediately adjoining it, is an old pit well about twenty feet deep with a wall of stones, not of brick. The water of this well was not used for drinking, but was used for cleaning cooking utensils, etc.

To the northeast, and immediately adjoining the old log house, was the privy, which apparently was not a pit, or if a pit, had been gradually filled up. If meant for a dry earth closet, there was no provision for cleaning it, and it did not look as if it had been cleaned for some time. The distance from this privy to the well was about forty-six feet.

The corner of the old house next the privy was the room evidently used for cooking as the stove was there, and portions of the wall towards the privy were wanting, so that there was free access for flies for instance from the privy to the kitchen.

The well which was used for drinking purposes was in the barn, and its relationships there are best shown in the diagram. It was about twenty feet deep and contained about six feet of water.

It was impossible to obtain any data as to the character of the soil and the effects of a sudden rainfall upon the wells. Apparently, however, the soil was fairly porous as the wells were never known to run dry.

2nd. The Walton premises.

This consists of a one-storey house without a regular cellar. A hole has been excavated under one of the bedrooms and was used as a place for storing vegetables, etc. Whilst Mrs. Walton was ill it gave out a very bad odor.

The well was situated as shown in the diagram. It was without a pump and smelt badly.

3rd. The Bonall house.

Nothing of an unsanitary character was noticed here. The well was between the house and the road, and the stables were some distance behind the house, and the privy was quite a distance back of the stables.

4th. The Hallock premises.

Nothing was present here of a specially unsanitary character. The well was a long distance from the privy.

When we look at these premises and take all the facts into consideration, we see that we are met at the outset by the difficulty of accounting for the first case.

Neither David Pallister nor Mrs. Robert Walton was in the habit of going from home, nor could I find that they had been exposed in any previous case. No one had been visiting at either house for months previously, so that it does not seem likely that it was introduced from without. It is the same difficulty which we meet with in every study of country epidemics of typhoid.

Enquiry as to previous cases elicited the fact that there had been typhoid in the old Pallister house some eleven years ago, but I do not know that this helps us in coming at the first cause.

My own opinion is that in typhoid, we must accept much wider distribution of the bacillus than is evidenced by the occurrence of the disease, and that such apparently *de novo* development of epidemics as in this instance is simply due to

the return of virulence to a non-virulent typhoid bacillus already present, this return being produced by local unsanitary conditions. We now know this to be the case in diphtheria and cholera, and there is no reason to believe that it is not the case also in typhoid. That unsanitary conditions were present, I think is sufficiently well shown by the description of the premises, and the results of the bacteriological examination of the wells.

Typhoid once present in the Pallister household, how are we to account for the succeeding cases?

The barn yard well may have been a factor in the first case. I doubt very much whether it is responsible in the succeeding cases. It certainly did not become infected after the first case, as it was situated too far from the house and privy. The old well might have been infected through the forty-six feet of soil from the privy, but I hardly think that this was possible in the length of time that elapsed between the first and subsequent cases. The only other explanation is that of direct contagion from the stools. This, I think, the most likely explanation, although the physicians in attendance warned the people as to the danger, and ordered them to bury all the stools out in the fields far away from the houses. Great care may or may not have been taken in the disposal of the stools, but the manner in which the cases developed point to contagion more than to any other possible explanation. It is exceedingly probable also that the privy at the Pallister house early became infected, and the close proximity to the kitchen and milk house render it extremely probable that flies from the privy passed backward and forward through the wall of the kitchen and carried micro-organisms from the privy to the food. In fact from the situation I cannot see how this could help occurring.

The occurrence of the two additional cases in the Hallock house where contamination of the drinking water is excluded, and in the Bonall house where it is equally excluded gives strength to the argument of direct contagion.

Finally the extreme virulence of the organism as evidenced by the fatal character of the epidemic is further strong evidence in favor of direct contagion.

It seems to me that from our general knowledge of pathogenic micro-organisms we may argue *a priori* that the more virulent it is, the more likely it is to be directly contagious.

I would conclude my report by recommending:

- 1st. That the two Pallister wells and the Walton well be closed.
- 2nd. That the Pallister privy be removed from its present position to a distance from the house, and the old privy be excavated and clean earth put in.
- 3rd. That the Hallock well and the Bonall well be cleaned and disinfected by freshly slaked lime.

The Walton house should be placed in a more sanitary condition and it would be well also to pull down the old house at the back of the Pallister home.

All of which is respectfully submitted.

(Signed)

JOHN J. MACKENZIE.

4.—*Report Re Whooping-Cough at Grimsby Park.*

By. J. D. MACDONALD, M.D., HAMILTON.

To the Members of the Provincial Board of Health :

GENTLEMEN,—It having been reported to the Provincial Board of Health, that at the “Grimsby Camp” children were suffering from whooping-cough, it was deemed advisable that enquiry should be made into the degree of prevalence of the malady, and as to the means, if any, which might have been taken to check it, or to limit the disease to the locality in which it was said to have appeared.

Accordingly, on Friday the 7th August, your committee visited the grounds, obtained an interview with the Rev. Mr. Walsh, the superintendent of the camp, and with other officers, and parting with these gentlemen proceeded to visit the various residences, in order to obtain all possible information regarding the rumoured epidemic.

The whole day was spent in this manner, and the inspection may be regarded as thorough.

Your committee met no instance of the actual existence of the disease, but heard sufficient to make it evident that cases of whooping cough had been at the “park.” The affected children having been brought there for change of air, and thus to accelerate their recovery—one or two such families were found. In none of these was any coughing heard, and they declared themselves to be now free from that or other symptoms. In neither of them was enquiries of your committee apparently appreciated as being necessary. It seemed as though expulsion from the “park” was feared as a consequence.

All seemed surprised that a report of whooping-cough should have gone abroad. The worthy superintendent gave your committee to understand that in his opinion it was a mere childish experience, which all had to go through, and that the combination of the place and season formed the very best way for getting through it successfully. The same sentiment seemed to pervade the whole circle of the camp. The propriety of a “sanitary cordon” was suggested by your committee in the event of a re-occurrence of that, or of any other epidemics. The suggestion was received with general disfavor as being unnecessary, and as being inconsistent with the traditions of the place and therefore impracticable.

Your committee met a larger number of people who knew nothing about the presence of an infectious disease, than of those who did. The whole of the society seemed in a very happy condition. No fears on the subject of infectious disease seemed to exist, with the exception of diphtheria, that disease appearing would break up the community, but for whooping-cough, the common thought seems to be that all children affected with it, are welcome, and that a residence at the “camp” will soon cure their trouble. Within certain limits perhaps, that impression is correct.

(Sgd.) J. D. MACDONALD,

Commissioner.

Hamilton, 10th August, 1896.

5. *The Serum Diagnosis of Typhoid.**

By J. J. MACKENZIE, B.A.

The recent practical application of the specific serum reaction of Pfeiffer in the diagnosis of typhoid fever is one of the most interesting results of recent bacteriological work.

In his researches upon Asiatic cholera, Pfeiffer, of Berlin, discovered that the serum of an animal rendered immune to cholera would, when introduced into the peritoneal cavity of a guinea pig, along with a virulent culture of the cholera spirillum, cause the dissolution and disappearance of the spirilla in a remarkably short space of time. If the immune serum was not introduced, the spirilla multiplied, and the animal died.

This reaction, which was spoken of as Pfeiffer's phenomenon, was used for the identification of suspected spirilla. In many cases all other bacteriological methods left us still in doubt whether a given spirillum was that of Asiatic cholera or not. This test proved absolutely reliable.

Pfeiffer and Kolle extended the method to the typhoid bacillus so as to distinguish the true typhoid organism from typhoid-like forms, which are frequently found in water, and they also so elaborated the method as to show that the reaction was specific.

In the course of their researches they found that it was not always necessary to introduce the mixture of immune serum and bacteria into the peritoneal cavity of a guinea pig, for a certain amount of change took place if the serum and the culture were mixed in a test tube with bouillon. If the culture was not of the same germ which had produced the immune serum, no change occurred; if it was, the bacteria fell to the bottom of the tube in a flocculent precipitate. A microscopic examination showed that they had lost their motility, and had become entangled so as to form clumps.

Gruber and Durham, of Vienna, discovered this test-tube reaction almost simultaneously with Pfeiffer, and they gave to the substance in the serum which causes the clumping the name agglutinin. Pfeiffer, on the other hand, calls it paralyisin.

Widal was the first to see the clinical significance of these facts, and to examine the effects of the blood serum of patients suffering from typhoid upon cultures of the typhoid bacillus. He was able to find an agglutinating action present when he used the serum alone, or the fresh blood, or a watery solution of the dried blood.

Dr. Wyatt Johnston, of Montreal, has made a practical application of Widal's method in allowing a drop of blood from a suspected typhoid case to dry upon a slip of paper, and then later, in the laboratory, moistening the drop with sterile water, and mixing a portion of it with a fresh bouillon culture of typhoid in a hanging drop. This is watched under the microscope, and, if the case is typhoid, in the course of from half an hour to an hour agglutination of the bacilli occurs. The advantage of Dr. Johnston's method is that it is eminently practical, and enables a bacteriologist in a central laboratory to make diagnosis for a large area of country in the same manner as has been done in diphtheria and tuberculosis.

I have used Dr. Johnston's method in my own laboratory, and am well satisfied with the results obtained so far.

* Read at the Pathological Society, November 29th, 1896.

After mixing the culture and the watery extract of the blood of a typhoid patient, as a rule no change is observed for a few minutes, the bacilli moving rapidly backwards and forwards through the field with their characteristic motion. Then one notices individuals sticking together in pairs or in threes moving clumsily, and in a short time others join the clumps, the movement becoming always slower, until finally all the bacilli are tangled together in large clumps containing ten or more individuals, and all movement stops.

The reaction takes longer in some cases than in others. In one case it was complete before the preparation could be placed under the microscope, *i.e.*, in about two minutes. In the majority of cases it takes thirty minutes. My own experience is that if there is no evidence of reaction within an hour there is not much chance of its appearing, but it is well to observe the slides for twenty-four hours.

In order to be sure of accurate results one must use a very motile culture, *i.e.*, a fresh one, and it is well to have it so dilute that not more than, say, fifty to a hundred bacilli appear in the field.

A magnifying power of about 480 diameters is all that is necessary, and it should be used without the Abbé condensor, preferably with artificial light.

My results with this method have so far been very satisfactory, and I feel very confident that it will be found an important aid to diagnosis.

I have tried the reaction in eighty-two cases, in some of them upon several samples of blood taken at different times.

Sixty-one of these cases were typhoid, or subsequently turned out to be typhoid, and in fifty-seven of these I got a positive reaction: in four I got no reaction. I am not prepared to offer any explanation of the negative results in these four cases, except that in one I had an exceedingly small sample of blood.

In twenty-one cases not typhoid, or subsequently turning out not to be typhoid, I got a negative reaction in all; there were, amongst other non-typhoid cases, tuberculosis, acute dilatation of the heart, articular rheumatism, septicæmia, and blood from healthy individuals. A number of tuberculosis cases were tried, including two cases of meningeal tuberculosis, with negative results in each case.

I have tried cultures of *bacillus coli communis* in parallel preparations with the typhoid bacillus without obtaining the reaction.

Before closing, a word as to the explanation of this phenomenon. It is evidently due to some specific substance—probably bactericidal—produced in the organism as a result of the typhoid infection. It is likely not of the nature of an antitoxin such as we find in diphtheria and tetanus. An experimental work has shown that the antitoxins are certainly different from the bactericidal substances found in blood serum. It is also not an alexin, in the sense in which Buchner uses the term, as they are not specific. For the present it seems as if no theory as yet will properly explain the phenomenon.

6. *Report on the Tuberculosis Test of a Cow in York Township.*

BY J. J. MACKENZIE, B.A.

To Dr. P. H. Bryce.

DEAR DOCTOR,—Acting under your directions, I was present at the second test for tuberculosis, made upon Birrell's cow by Dr. McPherson.

The tuberculin I made up myself and took down to Mr. McPherson's stables at 10 p.m.

The temperature of the animal before injection of tuberculin was as follows:

May 9th, 9.40 a.m., 102 4-5.

May 10th, 5.38 a.m., 100 4-5.

May 10th, 11 a.m., 100 2-5.

May 11th, 8 p.m., 102.

May 12th, 9 a.m., 101.

May 12th, 3.50 p.m., 101 4-5.

At 10.10 p.m., 90 minims of Tuberculin were injected subcutaneously, two doses of 45 minims each. I advised using a somewhat higher dose than ordinary as the animal had already received 70 minims of tuberculin on April 13th.

The temperature after the injection ran as follows:

May 13th, 4.10 a.m., 102 1-5.

May 13th, 6.32 a.m., 103 1-5.

May 13th, 8.39 a.m., 104 1-5.

At 9.25 I was present, and the temperature had reached 104 2-5.

It rose during the morning to 105 1-5 and then gradually dropped, reaching 101 4-5 at 10 o'clock at night.

The animal thus showed undoubted evidences of tuberculosis.

The autopsy was held at 10 a.m., May 14th, at which I was also present.

The lower lobe of the right lung was completely filled up with tubercular deposits.

Most of the bronchial glands were caseating and calcareous.

The mediastinal glands were also tubercular.

There were a number of small tubercular deposits in the liver.

The other organs were apparently healthy.

I made a microscopic examination of one of the diseased bronchial glands, and found the bacillus of tuberculosis.

The *post mortem* examination thus fully confirmed the results of the tests made with tuberculin April 13th and May 12th.

I remain,

Yours sincerely,

(Signed) JOHN MACKENZIE.

7. *The Diagnostic Value of Tuberculin in Bovine Tuberculosis.*

(FROM JOURNAL D'HYGIENE, MARCH 19, 1895.)

The Minister of Agriculture of France recently transmitted to the French Academy of Medicine a request to report on the value of tuberculin as a means of diagnosis in tuberculosis. The section on veterinary medicine has just reported on the subject.

The report begins by pointing out the general distribution of tuberculosis. In some departments of France it exists to the extent of twenty-five per cent., in others where the cattle live largely outdoors it is much less. It prevails to the extent of only five per cent. in Belgium; is very prevalent in some sections of Germany; while in certain herds in England fifty per cent. of them have been found to have the disease.

It is M. Nocard who receives the honor of having demonstrated that the lymph of Prof. Koch possesses a specific action in the diagnosis of tuberculosis in animals. Its use in injections of thirty to fifty centigrammes causes a rise of temperature, indicating the existence of tuberculous areas in the tissues, but produces no appreciable effect in the non-tuberculized animals.

This febrile reaction is intense in the early stages of the disease, and appears at the end of twelve or fifteen hours after injection.

The report reviews the adverse criticisms which have been made on the action of tuberculin and cites confirmatory experiments and clinical facts as to its value. Moreover, the International Veterinary Congress, held in Berlin in 1895, almost unanimously adopted the following resolution: "Tuberculin is a most valuable means of diagnosis and can render the greatest service in the battle against tuberculosis."

In the matter of prevention, great advantages result from the use of tuberculin.

In fact, we can say to-day that nothing is more simple than to rid a stable of tuberculosis; it is sufficient to submit every animal to the tuberculin test, separating those which have reacted from the healthy, disinfect the stable and introduce only cattle known by the test to be free from tubercle. To weed out little by little the doubtful animals by fattening them and sending them to the butcher before they are so diseased that the meat cannot be used without danger to the public is easy and practicable.

The unanimous conclusion of the Academy of Medicine is thus formulated:

"Tuberculin is a most valuable means of establishing the diagnosis of tuberculosis, and every advantage is to be got from its use."

At the same meeting of the French Academy, Dr. Grasset, of Montpellier, presented facts with regard to the value of small doses in the diagnosis of tuberculosis in man, and further experiment is urged in order that the Academy may recommend precise rules for its use in human subjects.

III.—CANADIAN CATTLE AND THEIR INSPECTION.

BY P. H. BRYCE, M.A., M.D.

When it is considered that the estimated cattle population of Canada to-day is 6,500,000, the number of sheep 4,000,000, and that of hogs 2,000,000, it is apparent that the conservation of this source of national wealth is of the greatest possible interest to the people as a whole, as well as to those whose interests are so largely associated therewith. Its relative importance is seen in the fact that according to the Ontario statistics of 1893, there was in the Province an estimated total number of these three classes of animals of 5,000,000, valued at \$116,000,000, while the total value of the stock in Massachusetts was but \$14,200,000, and that of the five New England states, with New York, New Jersey and Pennsylvania added, was together less than three times that of Ontario alone. That the growth and development of this source of national wealth is in large measure due to the peculiarly fortunate position of the country, as regards climate and soil, and the still more fortunate accident of a large proportion of Canadian farmers, having been in themselves or their children, trained to the care of cattle in their homes in Britain is generally understood. That the rich pastures of old Canada have enabled stock-raisers to produce an exceptionally fine race of animals of every kind was evidenced by the proud position which exhibitors held at the Columbian Exhibition in 1893; and that the cattle of the Canadian Northwest owe their high quality to this heritage may be taken for granted. Further, that the cattle population of the country is relatively enormous may be seen in the fact that while there are in Canada some 1,200 cattle for every 1,000 people, there are in the United States only some 650 cattle to every 1,000 of the population.

It is however a somewhat curious commentary on this condition of the relative cattle supply that while from Canada there were exported almost wholly to Britain, according to the trade returns, in 1889 81,478 cattle and 316,013 sheep, and in 1895 only 93,806 cattle and 291,862 sheep the United States, with their enormous home market, exported in

1885.....	135,800 cattle and	234,509 sheep
1889.....	294,128 “	18,690 “
1894.....	359,278 “	132,370 “

or an increase of 50 per cent. of exports of cattle from the United States as compared with that from Canada for the same period.

It may incidentally be observed that while in 1885 there were imported 78,796 dutiable cattle into the United States, nearly all from Canada, only 1,280 of the same class were imported in 1894.

It is therefore quite manifest from these figures that notwithstanding the possession in Canada of this enormous source of possible wealth, its realization really depends upon two perfectly evident and well-defined conditions, viz.:

First. The maintenance of the stock in the highest possible degree of health and vigor; and

Second. The ability to place them on the foreign market at a profit.

Reasons have already been given showing why Canadian cattle should have, and have hitherto had, a history of freedom from those epizootic diseases which destroyed hundreds of thousands of stock on the continent of Europe and in

England within quite recent years. At a time too, when the United States cattle were scheduled in England in 1882, owing to pleuro-pneumonia being reported endemic in several of the eastern states and Illinois, Canada still maintained the high standard of her cattle for freedom from either epizootic or reported endemic disease. For this we must largely credit the vigilance of the Department of Agriculture, which, in 1874, established the ninety days quarantine at Quebec for all imported neat cattle. As regards any further supervision of our herds there seems no evidence of such having existed, so far as the reports of the Department are concerned, except a short reference to an investigation into an "epizooty," by the order of the Lieutenant-Governor of Ontario in 1871.

If an examination of the municipal enactments of Ontario at that time be made, it appears that powers existed to inspect and seize diseased meat and milk exposed for sale; but as no Provincial Health Act or organization existed until 1882, it may be said that further inspection of cattle did not exist up to the latter period. Indeed, so far as Ontario is concerned, no further provisions than had previously existed in the Municipal Act, were introduced for the inspection of cattle, and their meat products, until 1890, when the diseases scheduled in the "Animals Contagious Diseases Act" of the Canadian statutes were definitely named in an amendment to the Ontario Public Health Act, as being those for which seizure as unsound meat could be made by an officer of any local board of health, but with the difference that no compensation was provided for. That up to the present, no further great extension of the internal federal inspection of cattle in Canada has been made may be seen in the fact that the public accounts show for 1895, that apart from officers stationed at the ports of entry at Sarnia tunnel and Windsor, which involved an expenditure of \$600 per year for an inspector at Point Edward and the expenditure of a proportionate amount to that at Windsor for the inspection of the 170,000 cattle, the 1,300,000 hogs, and 900,000 sheep in transit almost wholly to the eastern markets of the United States through these two points, the Dominion officers spent on internal inspection less than one hundred days, distributed over some four or five officers, at a cost, including compensation for destroyed animals given, of less than \$1,000 in all. Further inspection under the Federal Act during 1895, as in previous years, has been mostly by officers stationed along the Manitoban border, by the mounted police, and at the ports of the St. Lawrence.

As regards cattle, it must not be forgotten that in a progressive community their environment as that of mankind, and even of plants, must of necessity to some extent undergo changes. This has been true, notably in Ontario, with regard to the care and housing of our increasing dairy herds and stock cattle within the last thirty years. Formerly most cattle were exposed to winter cold, while to-day for six months many of them are continually housed. Similarly there is a change caused by the increase of the business of transhipment of cattle to the large cities and for export.

With these changing conditions we have seen different diseases hitherto absent, occurring first in localities and thereafter becoming generally diffused. Thus as we have seen this, notably in the black-knot on cherry and plum trees, so in animals, we may have the localized presence of scab in sheep, and in many districts lump-jaw or actinomycosis, once localized, but now quite prevalent in cattle. Some five years ago this disease was only reported present in one or two districts, and then only occasional cases; but now cases are heard of from many sections of the province. While it is true that we may find in some districts a disease to have been present and not known to the general public, yet there can be no doubt that under existing conditions the sub-acute or more chronic dis-

eases of animals, as of men, are especially those which spread according to perfectly comprehended methods through no serious attempts being made for their limitation. Of no disease in cattle, unless those just mentioned, is this more true than of tuberculosis. It is not more than five years since it has been in practice officially recognized in cattle in the United States, and a still shorter time in Canada. Even up to the present in England this disease is not dealt with, except by the cattle inspectors of each city as a case of unsound meat, and then in isolated cases; though some of the English county councils have been testing with tuberculin in order to gain a correct idea of its prevalence, and a Royal Commission has brought in very strong reports regarding its fatal character and extent, and at the annual meeting of the Imperial Institute, held in Glasgow in August, 1896, a unanimous resolution was passed asking that the Imperial Government would give power to municipalities for the systematic introduction of the tuberculin test.

But in Germany, Belgium, France and Denmark systematic examinations of animals before slaughter, and of the organs at the time, have been carried on for years, and within the last three or four years systematic inspection and testing of herds with tuberculin has been carried on in Denmark at the cost of the Government; while in 1896 an order has been passed by the House of Deputies, France, excluding all animals at ports of entry which on experiment are proved tuberculous. That the disease was discovered prevalent to an unexpected degree in every European country where systematic examination of animals has been made is well known; but nowhere has its prevalence been more of a surprise than in those Northern States, or indeed in all those where the housing of cattle in winter is a common practice, wherein Boards of Cattle Commissioners have been appointed as in New York, Massachusetts, etc.

Since November, 1894, inspectors or members of the State Board of Cattle Commissioners in Massachusetts have made a systematic examination of all animals at the stock yards. All suspected to be tuberculous are set apart as unfit for sale, all condemned are sent to the abattoirs and destroyed, and any proved free on slaughter are sold for beef. The healthy are branded and sold anywhere. During the period of inspection, begun in Massachusetts, 6.3 per cent. had been proved to be tuberculous. In fourteen states laws similar in character have been passed within very recent years, intended to deal specially with cattle inspection, power to give compensation being a principle in every case. With regard to occasion for similar action on the part of Canadian authorities, while it may be said that no example set by these neighboring states should be a law here, unless reasonable grounds for such can be shown, yet it must be said that the absence of knowledge with regard to the prevalence of disease on the part of those supposed to know, does not necessarily premise the absence of it. This has been notably true with regard to tuberculosis, regarding which such extended action is being everywhere taken, and of which Prof. Nocard says, "that in all cases except advanced pulmonary tuberculosis, where the disease exists in the organs, all methods of diagnosis previously applicable were comparatively valueless, and until lately the veterinary surgeon remained powerless. It is not the same to-day, for we have in tuberculin a certain means of making the diagnosis of tuberculosis, even when the signs are quite recent and limited." The limited character of the machinery for doing systematic internal or provincial inspection in Canada has already been noticed, and hence it would be too much perhaps to expect more accurate information under existing circumstances; but the very frequent communications made through Local Boards of Health, notably within

recent years, to the Provincial Board, show, if not a growing increase of local disease, at least a notably growing knowledge of existing cases, and sensitiveness to their effects upon the public health and the welfare of the cattle industry.

We have already referred incidentally to state action which is being taken across the Border, with a view to internal inspection and absolute interdiction of cattle from being imported into the state or set free by railroad companies until by experiment they have been proved free from disease. But during the past ten years in view of the scheduling of American cattle in 1882 in England, the federal authorities of the United States recognized by the establishment in 1884 of the Bureau of Animal Industries that prompt action had to be taken to deal with the situation. How much this was needed will be seen in the fact that there were exported in 1885 but 135,800 cattle, while owing to the laws passed by Italy, France, Hungary and Germany, in 1879-81, prohibiting the importation of American pork, there was a falling off of millions of pounds in the exports of hog products during the succeeding five or six years.

In 1884, with much doubt as to its workable character, owing to the predominant idea of states' rights, the United States Federal Government passed an Act establishing the Bureau of Animal Industries. Pleuro-pneumonia was at the time prevalent in cattle, notably in Cook county, Illinois, and the first efforts of the bureau were devoted to stamping this disease out. Some \$500,000 were set apart in 1885, for the investigations of the bureau and for compensation where animals were destroyed. Within three years the disease was in practice eradicated from the country. Realizing that the meat industry ranks third in the export trade of the country, and remembering that the pork trade which in 1881 amounted to \$104,660,000 with foreign countries, had been practically lost except with Great Britain, Congress wisely determined upon fostering it in every way possible. In 1890 an order of the Secretary for Agriculture was made for the systematic inspection and marking of all cattle and sheep for the export trade, and in 1891 a further Act was passed for the microscopic examination of the tissues of all hogs at the time of slaughter, where meat was intended for export, as to freedom from trichina.

The introduction of this systematic inspection has been rapid, and so far as the foreign trade goes is very complete. Its effect on the expansion of this trade from 1889 to 1894 has been already mentioned. Within the last two years several enactments have been added by which it is necessary for all railways engaging in interstate trade to have bills of health before they are allowed to transport animals from one state to another. The completeness of the inspection of export cattle by the federal inspection may be illustrated by the practice at Buffalo. There are there some fifty acres of yards and shortly some sixty more will be added for the extension of the stockyards.

A staff of twenty-three officers, inspectors and clerks, and microscopists are constantly engaged in carrying on the work of inspecting and tagging live cattle at the yards, of animals on slaughter at the registered abattoirs or packing houses, and of the tissues for trichina in the laboratory. The work of each division is daily reported to the bureau at Washington.

This work has confessedly been undertaken for the re-establishing and extension of the foreign cattle trade of the country. It was felt that further federal interference was undesirable in a work which properly belonged to the various state health departments. The recent extension of the inspection to interstate commerce has been mentioned, and the establishment of a basis of co-operation between the federal bureau and state boards is already in some instances an accomplished fact. How far internal municipal inspection can be

systematized so as to be a part of one common scheme for unifying the whole work really into one, first, what we call in health work, house to house inspection, up to the inspection of cattle for export remains yet to be demonstrated.

With, however, the relationship between the federal and provincial jurisdictions in Canada, more accurately defined and better understood as they are, with practically the same provincial health laws, and largely common municipal methods, it would seem a matter of national moment to enquire whether it be not possible to establish by co-operation a system of national inspection of cattle, so complete as to cover the whole scope of the work which has already been fully indicated as being so absolutely necessary. With such a scheme for the operation of mutual assistance as we have fortunately been able to establish in federal quarantine, provincial and municipal matters relating to the public health, one would have no hesitation in saying that the wealth of the individual farmer, the provincial prosperity and national wealth will all be notably increased, with an expenditure surprisingly small in comparison with the increased amount of work done, and the great advantages accruing from combined efforts.

The extent of the interests involved, the opposition which Canada has to encounter in the cattle trade, and the accentuation of the needs of producing the most marketable animals, and of supplying facilities for their export at the lowest possible cost have been briefly indicated. The question of the systematic inspection of our herds, thereby preventing the rise and spread of cattle disease, both epidemic and endemic, may be here referred to. The absence of any systematic inspection has already been pointed out. When it is remembered that the cattle population of Canada is distributed over more than two thousand townships and parishes in the older provinces, and over thousands of square miles of prairie in the newer provinces of the west, it is manifest that it is quite impossible for any system of federal inspection *per se* to do more than make occasional investigations of such outbreaks of diseases as would rapidly assume an epidemic character. It may be quite possible for such a staff to inspect animals for export, but they cannot prevent the numerous local losses resulting from disease in a cattle population, as in Ontario, more numerous than the number of people. If there are in addition to the 3,000 physicians in Ontario, some 600 local boards of health existing by law to still further prevent the spread of communicable diseases, it need not be argued that local supervision of our cattle population is seriously demanded in the public interest. During the fourteen years' existence of a central provincial health organization in Ontario, with its 600 local boards, it has been found in practice owing to the limited population and wealth of many townships that any systematic health work by adequately paid officials has not been found operative in practice. In 1890 an amendment making the union of all or a number of townships of a county into one health district legal was added to the Public Health Act, and again at the annual meeting of the executive health officers in 1895, the desirability of larger health districts in Ontario was discussed and urged. It was then pointed out that by such a method, the small nominal amounts paid to medical officers of health in the several townships of a riding at present would in all of the older counties be adequate for the payment of a single officer, whose time would be wholly devoted to public health work. It was pointed out that such officers could, without any serious expense, be equipped with a small laboratory, in which they would not only examine water, milk, and suspected causes of disease in man, but would in addition examine all specimens of suspected actinomycosis, hog-cholera, anthrax, and other similar contagious diseases in the animals of a district. It was likewise pointed out that such an officer would be always available when applied to, to investigate by the

tuberculin test all suspected cases of tuberculosis in cattle at an early stage, and thereby be able to advise measures to prevent the further dissemination of the disease in a herd. He would further be always available to investigate the many nuisances arising from the numerous complaints regarding cheese-factories and slaughter-houses, and in a dozen ways his services would result in the preservation of animal health, and in the improvements of milk and its products. The losses constantly referred to by our cheese merchants through low grade products amply illustrate the use for such assistance.

That such an enlargement of the unit of our health districts in Ontario is easy of accomplishment may be argued from the existing division of counties for purposes of school inspection, and from the fact that we see the system already in existence in the progressive province of Manitoba. There for health purposes the province is divided into four health districts, each presided over by a medical inspector appointed by the Government and who is a member of the provincial board of health. In addition, there is an official provincial veterinarian, the only one I believe in Canada, who is a member of the provincial health board, and whose services are available for any district. The county or district health divisions of British Columbia and in the eastern provinces of Canada further illustrate the ease with which existing machinery could be utilized. I have not included in such districts the larger towns and cities which are already in many instances doing satisfactory work ; but it need only to be said that with the passage of the Act for the inspection of meat and milk by the Ontario Legislature of 1896, we may shortly expect that by putting its provisions into operation we shall have an additional powerful aid in not only insuring wholesome meat for our people, but an additional means of extending inspection in the direction of animals intended for export.

It would thus appear that the only question of serious moment in the development of such a system of national inspection is that of the equitable distribution of the cost of the work. Assuming that the commercial interests demand a systematic inspection of our herds, and that the Federal authorities are looked to for putting it in operation, they will naturally be led to enquire what such a system will cost, if instituted separately and apart from existing provincial health organizations. At the Cholera Conference in February, 1893, held at Ottawa, between the representatives of the Federal Government and the several Provinces, the question of vital statistics was discussed, and a simple principle was unanimously approved of, whereby a system of very complete Dominion vital statistics could be established by utilizing existing provincial registration machinery on the basis of the provinces continuing their work and methods at the present cost, with the expenditure of an additional equal amount by the Federal Government in perfecting provincial methods, and utilizing their returns.

I have not attempted to deal with the further questions of the transportation facilities whereby our cattle can profitably be exported, or by which a system of dead meat and cattle inspection, such as that established in the United States, may be instituted. It is sufficient that what is being done there, and what its commercial results, have been set forth. With, however, a realization that the health of our own people is paramount, that this demands constant local cattle inspection, and that the latter means a notable increase in wealth for the nation as a whole, it will be apparent that in this direction the energies of all governments, whether federal, provincial or municipal, must be directed ; and when in operation it will not be difficult to add to local inspection such additional federal inspection and bills of health as may be demanded by the fears or prejudices of foreign consumers.

IV.—REPORT OF COMMITTEE OF SCHOOL HYGIENE ON DENTAL INSPECTION.

MR. CHAIRMAN AND GENTLEMEN,—At the last quarterly meeting of this Board, the question of the inspection of the teeth of children was discussed. The matter was brought before you by the reading of a report from the Educational Committee of the Trades and Labor Council, forwarded to this Board, in which an opinion highly favorable to dental inspection was expressed. A memorial was also presented by the Local Council of Women of Hamilton through its executive committee, in which the attention of the Board was drawn to the serious deterioration of children's teeth, and the Board was asked to recommend the appointment of one or more dental inspectors to visit all schools and public institutions in the province. Herewith the committee presents a copy of the first mentioned report:

*“ Educational Committee's Report of the Toronto Trades and Labor Council,
Feb. 7th, 1896.*

To the Delegates Assembled :

Your Educational Committee begs to report for your consideration:—

1. Examination of teeth in the public schools.

The letter from Dr. J. G. Adams, referred to your committee, has been duly considered. After a conference with that gentleman a sub-committee was appointed to proceed to the Dental Hospital on Elm Street, near Yonge, where Dr. Adams demonstrated, by the examination of the teeth of a number of children under treatment, that there existed some necessity for a proposal to have a periodical examination of children's teeth, with a view to their preservation thereby saving the children much suffering and their parents much trouble and annoyance.

It is a somewhat startling fact, if, as the Doctor alleges, the teeth of each succeeding generation of children are deteriorating, until it is now becoming a serious matter. He assured the deputation, that the teeth shown fairly represented the general condition of the teeth of the young at the present time. In a quarterly on dental matters issued by Ash & Sons, of London, England, an article “ On the Decay of Teeth in the National Schools of Germany,” by Dr. C. Rose, of Freiburg, Baden, Germany, fully confirmed the Doctor's statements. We give the following extract in corroboration:—

“ In England, through the indefatigable activity of the British Dental Association, it has come about, that at various public schools dentists have been appointed with fixed salaries. These dentists examine the children from time to time, and if desired treat them free of charge. In Germany, the Union of the Dentists of Baden has, at my suggestion, undertaken a general investigation of all the higher schools of the country. Further, in Germany, Sweden, Denmark and Hungary, individual dentists have taken the trouble to examine a larger or smaller number of school children, free of charge. The results of these investigations alone should be sufficient to convince the German Government of the necessity of dental hygienic measures in the national schools. I am not so confident as to hope that with us in Germany, as in England, salaried dentists will, within a measurable distance of time, be appointed. But one urgent duty the German

Government cannot shirk ; they must see that school children receive thorough instruction as to the utility of good teeth. The teaching, which a growing child imbibes in school from its master, sticks fastest in its memory. Even if all the doctors, dental surgeons and dentists were disposed to instruct the wider circles of the population through public lectures, etc., the knowledge of the importance of thorough attention to the mouth would be imparted but slowly. It is very different, however, when the schools undertake to further public measures of sanitation. The national school masters already require cleanliness in dress and body of those committed to their charge, and here and there during the object lessons the most needful measures for the care of the body are discussed. How easy it would be to interest children, as to the better care of the teeth, within the present educational scope."

Fully aware of the suggestions that might be made, that evidence was prepared for your committee, the quotation we have given from Dr. Rose effectually dispels the idea. It is quite evident, that there exists an imperative necessity for instructing our children upon the care of teeth ; the sooner this is done, the sooner will the many evils arising from the present neglect be stayed.

The possibilities of the propagation of disease in our public schools, through the present condition of the children's teeth, the suffering of the children, and the consequent discomfort of their parents, are features in our daily life, which would be soon remedied by the proper instruction in our public schools, urged by Dr. Rose in Baden and Dr. Adams in Toronto.

The proposal of Dr. Adams, is that a periodical system of examination should be had at once, with a view to the immediate amelioration of many evils, the parents of children being advised, by the examiner's report, of what is required to be done, free of charge, at places duly appointed for that work. Dr. Adams and many other dentists are willing to undertake the work of examination and the dental work, so that the cost to the taxpayer would be very small ; but legislation is necessary to give effect to a system of examination. At the present stage, it might be safe to make it permissive with school boards to have periodical examinations, if they desire it.

We recommend that the Minister of Education's attention be called to the matter, and the public school board be urged to investigate it, and if the evil is as represented, they be still further urged to adopt a system of examination, if they have the power to do so ; if they have not, that they seek the requisite powers."

A letter addressed to Dr. Bryce on the same question, by J. G. Adams, L.D.S. was also read at the same time. The following is a copy of the letter :—

TORONTO, February 10th, 1896

P. H. BRYCE, Esq., M.A., M.D.,

Secretary of the Provincial Board of Health.

"DEAR SIR,—Allow me to call the attention of the Provincial Board of Health to the alarming change in the quality and condition of the school children's teeth of the present day, and the effect of this condition on the health of the children.

For the past twenty-three years in addition to caring for the teeth of children in my regular practice, I have with the aid of assistants, carried on dental hospital work among the children of the poor in Toronto, filling and caring for

their teeth free ; and in addition to this I have examined the teeth of a large number of children in the public schools in the leading cities of Canada, and also in some of the American schools including the largest German school on this continent ; besides the teeth of some hundreds of children just arrived from England as well as children from Russia, Syria, Japan, and of the Indians and half-breeds of our own country. The examination of so many thousands of children has given me an opportunity, such as very few persons have had, of noting the condition and the change that is going on in their teeth. I find that children's teeth decay at a much earlier period than they did formerly, and that the quality of the teeth is so much inferior, that, unless they are filled as soon as they begin to decay, when the cavities are very small and before the nerve pulp has become exposed, they are soon past all hope of being saved. I am speaking of the permanent teeth—not only of the sixth-year molars, but also of the twelfth-year molars bicuspid and superior incisors, which now often begin to decay in a year or two after being erupted, and it is a very common thing to find some of them past being saved before they have been six months erupted.

In all the cities I visited, I found that 95 per cent. of the children had permanent teeth decayed, ranging in number from two to twenty per child, and that the same unhealthy and neglected condition universally existed, as very few of the children had any of their teeth filled, and the teeth and mouths of a large percentage of them were in a very unhealthy and often disgusting condition, not only injuring their own health, but also the health of the teachers and the other children, who are compelled to sit side by side with them in the often overcrowded and ill-ventilated schoolroom, inhaling the pestiferous air which has been exhaled by these children, having vile, dead, abscessed, pus-covered teeth and roots. During the six months, when economy in fuel and fear of draughts compels the windows to be closed, this polluted air is heated up and breathed over and over again, and it is always getting viler as the hours go by. But this is not all. Children, whose parents try to care for their teeth, are compelled to drink out of the same cup that these children have polluted with the pus that is so frequently exuding from the gums around the abscessed teeth and roots in their mouths. There is also another source of danger to the younger children from the common custom of chewing gum. The children often lend their gum to their playmates and thus, after being crunched into their vile teeth and mixed with pus, it is placed in the mouths of other innocent and unsuspecting children.

I am sure it is not necessary, that I should say anything more to convince you of the need of some prompt action being taken to prevent this wholesale sacrifice of school children's teeth and its accompanying effects on their health, education and prospects for useful lives. I shall just call your attention to one other thought, which I consider a very serious one, and that is, that these girls whose teeth are in the state I have described, in a few years' time will be the mothers of the next generation. What about the chances of their children, unless we now do our duty by their mothers, and give them a fair chance to grow up strong, healthy women.

I am thankful, after years of personal experience, I am able to say that this can be done ; but it will have to be by systematic, half-yearly, dental inspection of the school children's teeth, so as to inform parents of the condition of their children's teeth, in time to save them. In connection with this inspection, dental hospitals for the care of the teeth of the children of the poor would require to be provided, all of which can be done without increasing the taxes of the citizens, as this work can be made self-sustaining.

The Toronto Trades and Labor Council has taken much interest in the subject, and has passed a resolution to be forwarded to the Minister of Education and the public school board, requesting that action be taken in the matter of providing systematic dental inspection for the children in our public schools.

Trusting, that your board will give this important subject, (which has much to do with the welfare of the present and of the coming generation) its careful attention,

I remain, most truly yours,

J. G. ADAMS, L.D.S.,

Toronto."

The following resolution was moved, seconded and unanimously adopted by the Toronto Dental Society :—"This society, appreciating the menace to the present health and physical development of children, whose teeth are in an unhealthy condition, desires respectfully to represent to the Provincial Board of Health, in view of the importance to the health and well-being in future years, of good and useful teeth in childhood, that it is in the highest degree desirable that some scheme be devised to direct public attention to that subject, and that the Board of Health be requested to give the matter its earliest consideration."

Dr. E. Herbert Adams, a physician of this city, who was present at a session of the board, was also heard on the question.

It was finally decided to refer the matter to the committee on school hygiene, with instructions to report at once.

In forming an opinion on the necessity of dental inspection, a city physician is unable to obtain information from his personal experience of dental disease. Dental ailments, for many years, have been peculiarly the province of the dentists, and few physicians, except some in the country, pay any attention to diseases of the teeth. Most of us have no doubt seen some patients, who, having been too freely dosed with mercurials, have lost their teeth, or who, having incautiously used too strong acid mixtures, have been obliged to have their teeth filled, or perhaps extracted.

It must also have been observed, by many physicians, that decay of a tooth has not been discovered, until severe pain and perhaps irreparable mischief have ensued. Many adults pay but little attention to their teeth, some never use a brush or tooth-wash, while, at the same time, consuming foods and drinks containing acids and substances, which, like sugar, cause an acid change in the mouth, thereby exposing the enamel of the teeth to a very destructive action.

Many also eat by preference soft foods, such as the soft parts of bread, pastry, etc., which require but little mastication and thereby lose the salutary, cleansing effect, produced on the teeth by chewing solid food, which requires vigorous mastication before it is swallowed.

Children, who are beginning to get the permanent teeth, require more attention than has been devoted to them, even in well-to-do families. It is not, that they require to go frequently to the dentist, but rather, that their teeth should be inspected, at least every six months, in order to discover the beginning of decay in the permanent teeth. The old adage, "prevention is better than cure," applies to these cases peculiarly well.

The small pin-like cavity is easily filled, and decay arrested for a lifetime. When inspection has been neglected for a few years, examination reveals, on the

contrary, immense cavities which cannot be filled; and unfortunately the offending tooth has to be extracted, thus laying the foundation for further injury to the other teeth, and bringing about the necessity for false teeth.

It has frequently been made a matter of observation, that the people of Canada suffer from decayed teeth more than their European congeners. Statistics showing the actual percentage of persons having unsound teeth in Canada are probably not available, so that, in forming an opinion, one has to be guided by the experience and observation of practising dentists.

In a recent meeting of the Local Council of Women of Hamilton, Dr. J. G. Adams, a Toronto dentist, gave expression to some views on this subject, which will bear repeating here, as it is the business of the committee of school hygiene to interest itself in all matters, which relate to the hygiene of our Ontario schools and scholars. Dr. Adams stated, that "fully 50 per cent. of the public school children of Canada have bad teeth, and that bad teeth are the cause of much of their sickness, and cause the spread of a poison through their systems. To some extent the bad teeth were hereditary, but the condition was largely brought about by the use of soft foods, and the eating of too much candy and other stuff, that had a destructive action on the enamel of the teeth. In England the teeth are examined in the training schools, and dentists fill decaying teeth. Dental hospitals are found to work very successfully. There is a great contrast between these two lands—the one where teeth are cared for, and the other where they are not. There are ten people in England with sound teeth to every one in Canada, where 95 per cent. of the people have bad teeth. Bad teeth are one of the greatest inducements to dyspepsia, and it is a noticeable fact, that, in the charitable institutions of Toronto, there are much better teeth than are to be found in the public schools."

In order to find out with what frequency dental disease affects children, who are otherwise healthy, it is necessary to step outside the ordinary routine of dental practice and to examine them in large numbers. For this purpose children in schools are best, as it is easy to investigate them with regularity, and without risk of repetition.

On the initiation of Mr. Fisher of Dundee, and Dr. Cunningham of Cambridge, such an investigation is being carried out in various parts of the United Kingdom, by members of the British Dental Association. Children in parochial schools, industrial homes, and national schools are being examined, and valuable statistics will (it is to be hoped) be forthcoming, as the condition of each child's mouth is being permanently recorded, and every tooth is taken note of.

Dr. Denison Pedley, M.R.C.S., L.D.S., England, who in October, last year, issued a manual on "The diseases of children's teeth, their prevention and treatment," gives some statistics illustrating this subject, by himself and Mr. S. Spokes.

The dental condition of three thousand eight hundred (3,800) boys and girls, whose ages range from three years to sixteen years, is recorded. After detailing the conditions found under the headings "temporary teeth," "permanent teeth," "unsound teeth," and "sound dentitions," Dr. Pedley continues as follows:—

"Under the heading 'sound dentitions,' we enumerated those cases in which there was an absence of diseased teeth. Many of these were passing through the transitional period, between the first and second dentitions. Some children required merely the easy extraction of temporary teeth to place them in a satisfactory state; but it is a fact, which merits careful consideration, that out of

3,800 children's mouths inspected, there were only 828 in which neither filling nor extractions were required." He continues: "The facts above mentioned show very clearly that the hygiene of the mouth requires some consideration from another point of view, viz., as it affects the community. The children examined belonged to the poorer classes. The schools, Southall, Hanwell, Sutton and Feltham, were situated within twenty miles of London in extensive grounds, where the inmates have all the advantages of good and healthy exercise. They are gathered from various parishes in London. They are clothed, housed, fed and educated at the public expense.

"In connection with each school is a large staff of teachers, with band and drilling masters, and they are all under expert medical supervision. These points are only mentioned in order to show that the environment was generally good, and the children were living under healthy conditions; yet, notwithstanding all this, a vast amount of preventable disease existed among them."

"The boys in such schools are either taught a trade, or enter the army and navy."

"The girls are trained for domestic service."

"According to the report of the Army Medical Department for 1890, published in 1892, 55,373 recruits were examined; 21,712 were considered unfit for service. Of these, 506 recruits were rejected on account of "loss and decay of many teeth," and although the rejections were by no means so numerous as from other diseases, yet this is an interesting statement, and not only points to the prevalence of bad teeth among the working classes, but shows clearly how lads from rate-supported schools may be disqualified from a lack of cleanliness. From pauper schools of the metropolis alone 458 girls entered domestic service in one year. Five-sixths of that number had never known the use of a tooth-brush. The troubles of a domestic servant suffering from neglected teeth need little imagination to picture; but disordered digestion, irritability of temper, and inability to perform the allotted duties are some of the most obvious results which may appeal to employers."

These statistics show that dental diseases are common in England. Your committee has no positive information showing that they are less common in England than in Canada. It is evident, however, that if good results flow from the efforts of dentists in England, who inspect the teeth of children, give them the necessary attentions and instruct them in observing a proper hygiene of the mouth, the same mode of action should be pursued in Canada.

Your committee would therefore recommend, that this board would suggest to municipalities the advisability of appointing through their local boards of school trustees and local boards of health, dental inspectors, who would periodically visit the schools, examine the children's teeth, and advise them what course to pursue. The advice would in many cases be most valuable, preventing at a small outlay subsequent pain, sickness and deformity, and helping to lay the foundations of good digestion, the fruitful parent of sound health.

The practice of having the teeth examined periodically, would enable the children to form an excellent habit of attending to their teeth during the formative period of life, and avoiding habits of diet which have, by experience, been proved to be destructive or injurious to the teeth, either in childhood or adult life.

It would be more satisfactory to have the natural teeth preserved by this system of inspection, than to have the children exposed to the complete loss of some, or all their teeth at a later period.

Your committee has learned that the dental inspection of a school can be done efficiently and rapidly in a very short time, so that the objection need not be raised that, if this inspection is permitted, the time properly devoted to teaching will be wasted. Even in a large city, like Toronto, two inspectors, accustomed to such work, could attend to the children of the city schools.

A dental hospital might also be started for the benefit of the poorer children, who would not be able to pay the dentists for the necessary services.

In doing so, the municipality would be simply expending money in a most important work of mercy and utility, fully as necessary, in its way, as the support of public hospitals for the treatment of medical and surgical diseases.

Your committee would also recommend, that the attention of the Hon. George W. Ross, Minister of Education, be drawn to this matter, and that a copy of this report be sent to him.

All of which is respectfully submitted,

(Signed) J. J. CASSIDY, M.D.,
FRANCIS RAE, M.D.,
PETER H. BRYCE, M.D.,
Committee of School Hygiene.

V.—REPORT ON HYGIENE OF CANADIAN RAILWAYS.

By J. J. CASSIDY, M.D., CHR. COM. ON VENTILATION.

To the Chairman and Members of the Provincial Board of Health :

GENTLEMEN:—In order to ascertain, in a satisfactory manner, the actual status of hygiene on Canadian Railways, your committee on ventilation, extending its scope somewhat, mailed December 3rd, 1895, to the Canadian Pacific Railway and the Grand Trunk Railway copies of the following list of questions :

(1) What method do you use to secure the ingress and egress of air in your railway cars ?

(2) What means are taken to clean your railway cars, and how frequently are they cleaned ?

Give the details of cleaning ordinary passenger cars and sleeping cars, with the cleaning of bedding, carpets, etc., and the disinfection of closets.

(3) How often are your cars renovated or re-upholstered ?

(4) What action do you take if an invalid occupies a berth ?

(5) Have you inspectors to look after the cleaning of your cars ?

(6) Does the Wagner or Pullman Palace Car Company run sleeping cars over your line ?

(7) Has your Company sleeping cars exclusively under its own control ?

(8) What are your methods of heating cars ?

(9) What are your methods of lighting cars ?

(10)—(i) What precautions are taken to secure pure water for potable use in your cars ?

(ii) What precautions are taken to secure a pure ice supply for the same ?

The following replies have been received :

GRAND TRUNK RAILWAY OF CANADA.

General Passenger Agent's Office,

MONTREAL, 6th December, 1895.

P. H. BRYCE, Esq., M.D.,

Secretary, Provincial Board of Health of Ontario,

TORONTO, Ont.

DEAR SIR:—I have your favor of the 3rd instant, respecting the ventilation of our passenger cars, and beg to give the following replies to your questions in the same order as in your letter :

(1) Fresh air enters at the doors and leaves at the upper deck windows, the side windows can be used for ingress if necessary.

(2) Passenger cars are cleaned at the end of every trip. These trips are from 100 to 300 miles in length. Sleeping cars, which run longer distances, are also taken care of by the porters in the cars. The floors of all ordinary passenger cars are washed daily, and every two or three weeks the panelling and ceilings are also washed. The upholstered seats are taken out, beaten and aired, about once a week. The closets are washed out with soft soap and water daily, but systematic disinfecting is not followed. In sleeping cars, the whole of the upholstering, bedding and carpets are removed from the car, beaten and aired once a week.

(3) Passenger cars come into the shop, on an average, about every year and a half, and when such is the case the plush is thoroughly cleaned and re-dyed. The plush will last good, say, about three years, and, when it is renewed, the hair is taken out and teased, and to all intents and purposes, the seats are as good as new.

(4) Should any of our cars be occupied by invalids, known to be such, we would of course take suitable precautions to have the cars disinfected. The following orders are now in force :

The attention of agents at terminal stations is called to the matter of cleaning passenger coaches. Agents should satisfy themselves that each and every coach is well ventilated, clean and in a sanitary condition, before being allowed to leave the station, also that the water tanks have been thoroughly cleaned out, before being refilled.

Small-pox. It is necessary that every precaution should be adopted to prevent the spread of the disease, where it is known to exist in localities. A conductor, having a case of small-pox, or a suspicion of a case, on his train, must isolate the patient on the car in which he was discovered until the municipal authorities take charge of the case. A report must also be made to the Assistant Superintendent, so that steps may be taken to have the car properly fumigated.

(5) Yes.

(6) Yes, both.

(7) No.

(8) (a) The Baker Heater is in general use upon the cars of the Grand Trunk. We have other hot water heaters, but they act practically on the same principle ; (b) Steam supplied from the locomotive.

(9) Oil.

(10) The water is taken from a good source.

Our form of tender for ice reads as follows :

“The ice tendered for to be clear, solid and free from impurities, and subject to the approval of the Company’s Inspector.”

CANADIAN PACIFIC RAILWAY COMPANY.

Office of the Assistant General Manager.

MONTREAL, December 6th, 1895.

P. H. BRYCE, Esq., M.D.,

Secretary, Provincial Board of Health,
TORONTO.

DEAR SIR;—I take pleasure in giving you, below, what information I can, in reply to the several questions, addressed in your letter of the 3rd to our general passenger agent:—

(1) By side, ventilating windows in clear story of cars, opening vertically or pivoted horizontally. By specially designed ventilators in lavatories and closets. By side windows with protecting screens and dust deflectors. By specially designed ventilators over lamps.

(2) Ordinary passenger cars on local runs are swept out and dusted and urinals and closets flushed out every night. On through runs they are kept as clean and sweet as possible by trainmen, and thoroughly cleaned out and dusted and closets and lavatories attended to at end of run. Upholstered seats and backs are beaten and aired, as may be required, those which are movable being taken out of the car for this purpose. In our transcontinental service, ordinary passenger cars are changed at Winnipeg and are there thoroughly attended to. In ordinary passenger cars, which have not a special attendant, it is the duty of trainmen to keep the closets flushed out and urinals filled with ice and supplied with deodorizer. In the case of cars, accompanied by special attendants, this is looked after by them.

In respect to our first-class sleeping cars, the practice is about the same as in the case of ordinary cars, except that all movable cushioned seats and backs are removed from the car at the end of the run and thoroughly beaten, and mattresses, pillows and blankets aired. Bed linen is never used twice without being laundered. These cars are accompanied by a special attendant, whose duty it is to keep them clean and sweet and see that closets, urinals and lavatories are in good condition.

Our colonist sleeping cars, which have no upholstery in them, are thoroughly washed out at the end of each run with a hose. There is no upholstery in our tourist cars, except leather upholstered seats and backs, which are movable. These cars are accompanied as a rule by a special attendant and are treated in the same way as first-class sleeping cars. We use camphor in addition to the ice in the urinals all the year round, and disinfect the closets in our cars with a disinfectant of our own manufacture. In the case of cars accompanied by special attendants, the hoppers are disinfected two or three times a day as may be required, and this is done at least once a day in the case of other cars. I may say that most of our first-class sleeping cars are now equipped with flush closets.

(3) We endeavor to put our passenger cars through the shops, on an average, about once a year, when they are repainted or revarnished and thoroughly renovated in every respect and any required upholstering done.

(4) No person, who is known to have an infectious disease, is allowed on our trains; but, in the case of an invalid occupying a berth in one of our first-class sleeping or tourist cars, special attention is paid to the cleaning and airing of the curtains, upholstery, mattresses and pillows of that berth.

We have car foremen at all our principal terminal points, whose duty it is to supervise the cleaning of ordinary passenger cars and we have representatives of our sleeping car department, at such points, to look after such work on our first-class sleeping and tourist cars, and in addition we have a travelling inspector of our sleeping car service.

(6) Yes, the Wagner company furnishes a proportion of the sleepers, run in joint through-service over the Canadian Pacific and Wabash railways, equal to the proportion which the railway mileage of the Wabash company bears to the mileage of the Canadian Pacific company in such joint through lines; similarly the Pullman company furnishes sleeping cars for joint through-services over the Boston and Maine, Maine Central and Canadian Pacific.

(7) With the exceptions, mentioned in the answer to question 6, this company owns and operates its own sleepers exclusively.

(8) With the exceptions of cars on mixed trains and some of our unimportant branch and local trains, we use what is known as the Commingler system for heating our passenger cars. By this system steam is supplied from the engine and conveyed by a train pipe to a commingler in the car, in which it heats the water in the Baker-heater pipes and causes it to circulate. This system was adopted in preference to any system of heating exclusively by steam, so that we might be able, in the event of any accident to the engine or of anything happening, which might prevent a supply of steam being supplied to the cars, to fall back on the Baker-heater for heating our cars, and also, that, in the event of a car being set out at a point where there was no supply of steam to be had, the Baker heater would be available for keeping it warm. These considerations are of special importance in the case of our line, owing to its northerly location and the cold weather experienced along it during the winter.

On cars or trains on which the Commingler system is not used, the Baker heater is used. This is a system of heating by hot water, the water being heated as it passes through coils of pipe in the heater and being caused to circulate through pipes along both sides of the car.

(9) With the exception of a few cars running in our Chicago service in which Pintsch gas is used, and one or two private cars in which gasoline is used, our cars are lighted with mineral seal oil. It is not likely, that we will attempt any improvement in the method of lighting our passenger equipment at present, in view of the fact, that, undoubtedly before long, some reliable and reasonably economical system of electric lighting of railway carriages will be discovered.

(10) Water for drinking and washing purposes is supplied to our cars, except in cases of emergency, only at certain points on the line at which the water is known to be pure and suitable for such purposes.

We obtain the ice, required for our cars, at the different points from the very best possible sources, for instance, at Toronto usually from Grenadier Pond, at Owen Sound from Georgian Bay, and, at nearly every point where we require ice, we have our own ice houses. In Montreal, however, a local ice company, which obtains its ice from the St. Lawrence above Montreal, supplies us.

Copies of the list of questions, Nos. 6 and 7 being omitted for obvious reasons, were sent to the Pullman and Wagner Palace Car Companies. The following is the reply of the Wagner Company:—

WAGNER PALACE CAR COMPANY,
GENERAL MANAGER'S OFFICE,
CHICAGO, ILL., Jan. 11, 1897.

P. H. BRYCE, ESQ., M.D.,
Secretary Provincial Board of Health,
Toronto, Ont.

DEAR SIR,—Your letter of the 7th inst. has in due course been referred to me, and I take pleasure in replying to your questions numerically, as follows:—

(1) Our method of ventilating cars is by opening and closing the deck lights in the elevated roof, and the transoms at the ends of the cars.

(2) I enclose copy of instructions for cleaning cars, that are in effect at all points where we operate. These rules are followed at terminal stations, where cars are cleaned daily. We are now, at some points, experimenting with cleaning by means of compressed air, and shall probably adopt this method, where practicable.

(3) Our cars are shopped for painting, varnishing, re-upholstering, etc., once in from ten to twelve months.

(4) In the case of an invalid occupying a berth, the bedding, etc., is disinfected at the end of the trip.

(5) Yes.

(6)

(7)

(8) All of our cars are heated by steam, or from fires in Baker heaters—hot water circulation.

(9) All cars are lighted with oil lamps or Pintsch gas. About seventy per cent. of our equipment is lighted with gas.

(10) Water for drinking purposes is carried in separate tanks in all our cars and the ice supplied us is, in all cases, furnished by the different railroad companies operating our cars.

Formula for Cleaning Cars when the Wagner Company does all the work.

(1) On arrival of car in yards, it must be carefully inspected by foreman for defects, and repairs necessary to be done by carpenter, entered on conductor's inspection, unless already noted. Silk sash curtains are to be unloosened at the bottom and the rods slipped out and replaced in the fastener.

(2) Gather up spittoons and pile up neatly at double wash stand or in men's wash room.

(3) Take up carpet, rugs and mats, remove to the cleaning platform, clean by beating vigorously on both sides by carpet beaters and sweeping. Remove oil spots by washing carefully with Lightning Eradicator; roll up neatly preparatory to return to car. Remove soiled head rest covers.

(4) Open, dust out and wipe deck lights and all upper wood work and closet tops. Let down upper berths, dust off bunk head lining, wipe off wood work and moulding, wipe out collar and cuff racks, and clean berth lights and bunk

shutters and push berths up but do not lock them. Raise and jar dust out of windows and beat dust out of window curtains, allowing them to roll completely up when this is done. Pull down berths again and remove, first, lower berth mattress and hang it out of window so that it can be reached from outside. Remove lower berth blankets, shake out, fold and place on seat back, doing the same with berth curtains and upper berth blankets. Place head board upright in passageway, and then place upper berth mattress out of window on top of the lower. Remove spring bed, dust out upper berth, beat mattresses on both sides, replace the bedding in the berths in the reverse order to which it came out, wipe off head boards and close berths, after replacing head boards.

(5) Beat arm rests, head rests and plush cushions, under windows and sofas, also stationary cushions. Next pass seats and backs through the window to be beaten on a rack provided for that purpose. At the same time remove the pillows and shake them out, dusting out the pillow box, seat wood work and head rests, and brushing the dirt from the floor under the pillow boxes and heater pipes into the aisle, where it can be swept up, and sweep off foot rests with whisk broom. Cushions should be first bounced on the rack, plush down, to remove the sand and grit and also to clear the frames, then turned up and thoroughly beaten and swept. Unnecessary force should not be used in beating. Next sweep the car from the centre towards the ends, brushing out smoking room, closets and heater room at the same time, the accumulation of dirt being carefully gathered up and placed in barrels or boxes provided for that purpose. Next and last dust the lower woodwork, seat ends, partitions and doors, but do not under any circumstances use duster on berth fronts. Wipe windows and mirrors, closing outside window to lower catch only and inside window completely.

(6) Remove oil lamps to platform, fill with oil to within half inch of top of oil cylinder. Carefully trim wicks, examining them at the same time as to sufficient length and turn down below top of wick tube to prevent oil from working up. Remove, empty and wipe out drip cups, clean chimneys, wipe whole lamp free from oil and return to bracket. In the case of gas cars, let down globe, wipe it clean inside and out and treat cup and ring reflectors in the same manner. Close globe and wipe outside of lamp from ceiling down.

(7) Polish lamps, curtain rods, coat hooks and all metal trimmings.

(8) Empty and clean water coolers, polish and replace, first cleaning space covered by cooler and then polish wash stands, soap cups, tumbler holders, door locks and hinges.

(9) Wash out and polish spittoons, allowing them to remain in neat pile at washstand, and wash out closets, being careful to remove all excrement from discharge funnel.

(10) Wipe wood work from top down with clean white waste, using no polish.

(11) Fill water coolers with clean water and ice.

(12) Apply head rest covers in sleeping cars and in parlor cars clean tidies.

(13) Return carpet to car and lay, after wood wipers have finished their work, first covering with shellac varnish all oil spots on floor, after which remove lint and waste from cushions with counter duster.

(14) Scrub oilcloth at ends of car, and place mats and spittoons in position and wipe out heater room and under all washstands.

(15) Replace sash curtains and make minor repairs to carpet and upholstery.

Outside Cleaning.

- (1) Wipe off car body with dry waste, except in damp weather, when it should be washed with water, using long handled brush, rinsing with a hose without nozzle.
- (2) Clean outside of windows with tripoli, rubbing off with waste.
- (3) After scraping dirt off outside of trucks, clean with waste saturated with oil. When very dirty wash with hose and broom and as soon as dry go over with oily waste.
- (4) Clean platforms and hand rails.
- (5) Before reception of passengers, porters will wipe off dust that may have settled on window ledges and seats.
- (6) Paint steps and platform floor as often as required, using quick drying paint of standard color.
- (7) Truss rods and platform irons blackened as often as necessary.

Notes.

(1) The order of proceeding will necessarily be varied according to local surroundings or weather, but the foregoing formula should be followed as closely as circumstances permit. When railroad people do the cleaning proper, they should be educated to conform as nearly as possible to this system.

(2) At stations where racks cannot be erected for beating and airing bedding, small portable racks should be used between the tracks, the bedding being passed through the window by one man to the beaters outside, who will return it in the same manner.

List of Material Used in Cleaning Cars.

Waste, Tripoli, putz pomade, castile soap, common bar soap, mineral soap, muriatic acid, lightning eradicator, Modoc car cleaner, bags, sponges, feather dusters with handles flattened at one end in the form of a chisel point, brooms, old whisk brooms, buckets, seat beaters, ammonia, whiting, window sticks, iron ash buckets, iron ice pails, ice tongs, ice axe, three-foot step ladders with swing backs, seven-foot step-ladders with swing backs for outside cleaners, five-foot step-ladders with swing backs, fifteen-foot ladders to reach top of car, car wash brushes and poles, old car wash-brushes for trucks and hand-rails, washing hose, paint, varnish and bronze, horses and rack to beat bedding and seats, oxalic acid, alcohol, vermin exterminator, kerosene oil, bath brick, painters' scrubs, chamois skins, counter dusters.

Special Points in Car Cleaning.

To wash woodwork: Use solution of pure castile soap and clean water, applying with an old whisk broom or painter's scrub, trimmed off square and short, using soft pine stick in corners that are very dirty and gummy. Sponge clean with clean water. Wipe dry with chamois.

To polish hand-rails: If badly tarnished, first coat over with a strong solution of oxalic acid, applying it with a sponge tied on the end of a stick. After wiping this off, apply putz pomade diluted with kerosene oil, to which can be

added a quantity of bath brick powdered ; then wipe clean with waste and finish with rags or old plush. The same process applies to lamps, leaving out the oxalic acid, except in extreme cases, the putz pomade being applied with a piece of rag.

To polish nickeline, wash-stands and drinking-tanks : First, wipe perfectly clean with a sponge to remove soap, then polish, using a mixture of aqua ammonia and whiting, applying same with a rag. Wash-stands should be washed ; as quickly after arrival of car in yard as possible, to avoid setting of stains, which cannot be removed except by repeated polishing.

To bronze heater pipes : The best and most economical method is to first size the pipes with Gold Japan Sizing, and when about half dry apply the bronzing powder with a dry camel's hair brush. Bottoms of heater-rooms, door sills, closet floors and car roof should be painted from time to time with good paint, and iron door sills, platform trimmings, vestibule face plates and buffers should receive an occasional coat of asphaltum.

To wash head-linings : Head-linings should be washed in the same manner as woodwork, using the same material ; the men standing to do this work, on a plank elevated on horses. With the head lining shall be included the woodwork down to the berth fronts, porcelain shades of oil lamps, wart domes and globes of gas lamps, and deck lights and transoms on both sides.

To clean berth lights : When very gummy, so that they cannot be cleaned in the ordinary manner, should be burned off with muriatic acid. This must be done by two men, one applying the acid carefully with a rag or small sponge on the end of a stick, and his assistant promptly washing the berth light off with clean water. Great care must be exercised not to touch any part of varnish work with acid.

To scrub car with Modoc Cleaner : Stir Modoc well before using, then apply with a piece of old plush or curled hair, rub well until dirt is loosened, then wipe thoroughly dry with clean waste.

To disinfect car in case of its having been occupied by a person with contagious disease : First remove all spittoons, nickeline water-tanks and any other metal that can be removed, lower upper berths and place pillows on seats, taking a quantity of sulphur and place it in a tin pail over a pail of water, and after shutting car up tight, light the sulphur, having placed it where it can be seen through outside door, then leave car, keeping a close watch until sulphur is consumed, which takes about half an hour. After this, keep car shut up tight for about twenty-four hours. This will allow the fumes of the sulphur to penetrate all parts. After this, open up car, remove all bedding, seats, carpets, etc., and allow them to be well aired, after which they can be returned to the car, it having been thoroughly cleaned in the meantime.

To Exterminate Vermin from Cars : Use a mixture of turpentine, wood alcohol and corrosive sublimate, half gallon each of the two first to six ounces of the latter. The corrosive sublimate and the alcohol should be mixed separately and allowed to stand about three hours, the other ingredient then put in and the whole mixed thoroughly. As this preparation evaporates rapidly, only a small quantity should be used in a dish at a time, and the vessel containing the preparation kept corked at all times. This must be applied with a brush to the inside of the bunks, pillow boxes, around seat frames and blocks and allowed to enter all cracks and crevices and counter-sunk screw head holes ; in fact in every part of the car where bugs are liable to secrete themselves. Before the application of

the exterminator the blankets, mattresses, pillows, seats and backs and carpet must be removed from the car, examined carefully and thoroughly cleaned, and not returned to car until after application of this mixture to the parts mentioned.

The following reply was received from the Pullman Palace Car Company :

PULLMAN'S PALACE CAR COMPANY.

OFFICE OF THE SECOND VICE-PRESIDENT,
CHICAGO, Jan. 22nd, 1896.

PETER H. BRYCE, ESQ., M.D.,

Secretary Provincial Board of Health, Toronto, Ont.

DEAR SIR,—Your favor of the 7th inst. stating the Committee of Ventilation of the Provincial Board of Health desires information in connection with a study being made of "Car Sanitation," received. I beg to reply to your several queries as follows :

Q.—(1.) What method do you use to secure ingress and egress of air in your railway cars? A. Through openings in the sides of the upper deck of the car, these openings being regulated by means of glazed sashes which can be opened and closed from the inside of the car. Drop sashes in the outside doors when lowered, facilitate the ingress and egress of air.

The toilet rooms are ventilated by separate exhaust ventilators. Urinal and hoppers have vent pipes.

During warm weather each car is supplied with so-called air deflectors, one of which placed under the open window causes the air to be deflected from the car, thus producing a current of air from the inside to the outside of the car.

Q.—(2.) What means are taken to clean your railway cars and how frequently are they cleaned?

Give the details of cleaning ordinary passenger cars and sleeping cars, with the cleaning of bedding, carpets, etc., and the disinfection of closets? A. Pullman cars are thoroughly cleaned at the end of each trip. The upholstery, carpets and bedding are removed from the car. The dust is removed from the plush and carpets by means of compressed air, which effectually removes all the dust. The mattresses are beaten; the blankets are shaken and aired, and the pillows beaten and aired.

The closets and all fixtures therein are thoroughly washed and disinfectant applied.

While the cars are in service on the road, the employees keep the closets disinfected and frequently clean the spittoons.

Q.—(3.) How often are your cars renovated or re-upholstered? A. As often as a car is shopped, which, on an average, is once in nine or ten months.

Q.—(4.) What action do you take if an invalid occupies a berth? A. After the berth is vacated the bedding is removed and thoroughly disinfected. In the event of an invalid suffering from an infectious or contagious disease occupying the car, the car is thoroughly fumigated and cleaned under the direction of a proper health officer and the car is not allowed to be returned to service until proper permit has been issued by such health officer.

Q.—(5.) Have you inspectors to look after the cleaning of your cars? A. We have inspectors in each cleaning yard to look after the cleaning of our cars.

Q.—(6.)

Q.—(7.)

Q.—(8.) What are your methods of heating cars? A. Pullman cars are heated by hot water through the medium of the Baker heater, where the water is heated either by a coal fire or by steam from the locomotive.

Q.—(9.) What are your methods of lighting cars? A. Pullman cars are lighted by oil (300 fire test), gas or electricity.

Q.—(10.) What precautions are taken to secure for your cars (a) fresh water for portable use? (b) A pure ice supply? A. An ample supply of water both for potable and toilet use is furnished by the railroad companies at terminal stations and replenished at important stations *en route*. Natural or artificial ice is also supplied by the railroad company at terminal and other stations.

As the Grand Trunk Railway Company and the Wagner Palace Car Company in answering questions No. 1 has omitted to allude to the ventilation of the closets or the use of air deflectors in summer in their coaches three additional questions were sent them:

(a) Are the closets in your coaches sufficiently ventilated?

(b) Have the urinals and hoppers vent pipes?

(c) Are air deflectors used in your cars in summer?

The following reply has been received from the Wagner Palace Car Company:

CHICAGO, ILL., Feb. 5th, 1896.

P. H. BRYCE, ESQ., M.D.,

Secretary Provincial Board of Health, Toronto, Ont.

DEAR SIR,—I beg to acknowledge the receipt of your letter of the 4th inst. and to reply to your questions *a*, *b* and *c* as follows:

(a) Are the closets in your coaches sufficiently ventilated?

Answer. Yes.

(b) Have the urinals and hoppers vent pipes?

Answer. Yes.

(c) Are deflectors used in your cars in summer?

Answer: Yes.

Yours truly,

(Signed) J. A. SPOOR,
General Manager.

Air deflectors for the windows are used in summer by the Pullman, Wagner and Canadian Pacific Lines. Your committee has not learned if air deflectors are in use on Grand Trunk cars. As the Grand Trunk Co. has not replied to a request for information about the ventilation of the closets, your committee is unable to say if the closets in the carriages of that Company are ventilated or not.

With these exceptions, the replies to the first question, respecting the ventilation of carriages, show that all the companies use natural ventilation, fresh air entering through the open door or window of the carriage and escaping principally through the clear story windows in the roof. The Canadian Pacific Co. has specially designed ventilators in closets, and also ventilators over the lamps in the closets. The Wagner and Pullman carriages also have special ventilation in the closets of their cars, and the urinals and hoppers are ventilated. These are excellent provisions to prevent fouling of the air, for, if neglected, the door of the closet in a railway carriage would, when open, permit the odors of that quarter to mingle with the general air of the carriage, before escaping through the clear story windows.

In the opinion of Professor S. H. Woodbridge, of Boston, Mass., of the Institute of Technology, whose paper was read at the meeting of the American Public Health Association, held at Denver, October, 1895, natural ventilation in cars will, in the near future, be replaced by an artificial system. He holds, that ventilation in railway cars is most inefficient, depending, as it often does, upon the speed of the car and the direction of the wind; but the public will be much worse off in this respect within the next few years, unless the railway companies are compelled to take proper steps for the ingress and egress of a suitable supply of air. The development of high speed in railroad service will soon cause a change in the construction of cars. As the air resistance will have to be reduced to the minimum, a smooth and unbroken surface will have to be given to the outside of the car; the locomotive, and also the rear car of the train, will probably assume a wedge-shaped form. The supply of air must then be, as little as possible, affected by the movements of the cars or the wind; the air must be continuous and regularly supplied in generous quantity, the action of the system being plenum rather than vacuum, in order to reduce the inward leakage of cold air, smoke, dust and cinders. The air will be filtered, and in cold weather, electrically heated, and will probably be sent through the car by the action of a high efficiency fan, run by an electric motor, the dynamo being run by a belt from the axle. There will be no draughts and the temperature of the car will always be under control.

It is found that imagination plays a large part in ventilation effects, and any system, planned to give the surest and highest satisfaction, should furnish ocular evidence of its existence and its action. Prof. Woodbridge is of the opinion, that any successful car ventilating system will have to include self-announcing means, so as to enlist the imagination in its favor, and to put an effective stop to window raising, that fatal disturber of the working of artificial ventilation.

That the change in railway carriage ventilation, suggested by Prof. Woodbridge, or some other equally good plan may soon be introduced is desirable, and all lovers of hygiene will unite in the expression of the wish that, when put on trial, a really good artificial system of railway carriage ventilation may receive the active and intelligent support of the travelling public. As Prof. Woodbridge says, however, "human frailties are a greater obstacle to perfect ventilation than mechanical difficulties. The proper function of ventilation begins only after cleanliness has done its perfect work." And again, "It should be remembered in all ventilating undertakings, but one-half of the requirements are fulfilled, when the most perfect apparatus conceivable is furnished. The excellence of a tool does not insure the quality of its product. Quite as much depends on the user as the tool, and not infrequently a superior apparatus is made, on its reputation, to bear the burden of the operator's infirmities. It would seem to be of more than doubtful utility to equip coaches with carefully designed means for

ventilation, unless railway employes are systematically trained to their use, and they and the travelling public are educated to habits of cleanliness, and are free from the trouble-making notions and imaginings which prevail, even among cultivated people with reference to ventilation. For a long time to come to an innocent and dutiful ventilation is likely to be laid the sin of uncleanness of person and environment."

All of which is quite true, and it applies equally to the short comings of natural ventilation.

Whichever system of ventilation, natural or artificial, is adopted in an railway carriage, in which the average per capita space is only about sixty feet, it is evident that one of the first pre-requisites of comfort and health is cleanliness in the passengers. This naturally leads up to the second question, "What means are taken to clean your railway cars, and how frequently are they cleaned? Give the details of cleansing ordinary passenger cars and sleeping cars, with the cleaning of bedding, carpets, etc., and the disinfection of closets.

The replies given by the Canadian and American companies are most satisfactory. After reading them one is obliged to draw inferences laudatory of the cleanliness of Canadian railway carriages, as compared with the condition of schools, court houses, and other public buildings. Who in Canada has heard of school-room floors being washed daily, or even monthly, or of their walls and ceilings being washed every two or three weeks? Very few house-keepers, even in mansions where a good deal of company is seen, or in hotels, think it necessary to have the upholstered seats taken out, beaten and aired about once a week. The attentions paid to the closets and urinals on both the Canadian lines are praiseworthy; but the Canadian Pacific Company, not satisfied with having these conveniences washed out frequently, supplies the urinals in the cars with ice and camphor, as a deodoriser, and uses a special disinfectant in the closets, while most of the first-class sleeping cars are equipped with flush closets.

On looking closely into the answers to this question, differences of method in cleaning appear, which are deserving of notice.

The floors of the Grand Trunk cars are washed daily.

The Canadian Pacific local cars are swept out and dusted; the through cars are cleaned out, and dusted at the end of the run.

The floors of the Wagner sleeping cars are swept and dusted after the carpets have been removed.

The oil cloth at the ends of the car is scrubbed.

The floors of the Pullman cars are thoroughly cleaned, scrubbing of floors not being specified. The closets and fixtures are thoroughly washed.

A report published in the *Arbeiten Aus dem Kaiserlichen Gesundheitsamte*, 1893, IX. 3 throws a curious light on these answers. Drs. Petri, Kclb, and Friedrick examined the dust, which had been collected in German railway carriages. For each sample they swept up the dust from one square metre of surface, and with the proceeds inoculated the peritoneum of 117 guinea pigs. Three died from tuberculosis. They had been inoculated with dust taken from two sleeping cars. One of these cars seemed fairly clean, the other, though recently restored, seemed badly kept. The other guinea pigs were inoculated with the dust, taken from all sorts of railway carriages. In nearly half the cases, there was obvious evidence that the passengers had expectorated on the floors of the carriages, and the presence of the Koch bacillus was, as stated, proved in three cases. There were also numerous other pathogenic microbes found in this dust. In the fourth-class

carriages, the number of bacteria in the dust swept up from one square metre of surface was estimated at 12,624; in the third-class 5,481; the second-class 4247; and the first class 2,583. On the seats and partitions there were fewer bacteria, from 2,646 to 29, and the roof was almost free. Though the third and fourth class carriages are the most infected, it was much easier to clean them. When washed with hot water and soap, and then wiped over with a sterilized cloth the bacteria practically disappear; but for the better class carriage, with cloth covered seats, this is more difficult. Nevertheless, it is recommended to wash the surface of the floor with hot water and soap. (The Lancet, July 7th, 1894.)

The reply given by the Grand Trunk Company must therefore be pronounced the most satisfactory. Sweeping and dusting the floor of a railway carriage will certainly not remove bacteria, as thoroughly as if it were washed with hot water and soap. In the same connection, one is tempted to recommend to the Pullman and Wagner Companies, that they discontinue the use of carpets in their carriages, and substitute linoleum, which can be washed every day. The compressed air method of cleaning no doubt does remove a large number of bacteria from the cloth-covered seats, etc.; but leather-covered seats could be kept clean by washing the surfaces with a sterilized cloth. The replies to this question also reveal to your committee, the fact that cleanliness is much more practised in the management of railway carriages in Canada than in England. The London Lancet, in an editorial, (November, 1894,) commends the plain wooden seats of the third-class English carriages, which could be so easily kept clean; but asks significantly, "When are they washed? How often is the inside of the metropolitan third class railway carriages scoured with soap and hot water? The number of bacteria in the dust of a third class carriage is certain to be much higher than in a first-class one, and if there is more facility for washing, the need of washing is still greater." After describing a hand pump used on the French railway lines for throwing a mercurial spray with great force on cushions, seats, etc., in an infected car, the writer in the Lancet very properly says that, "this though excellent in the case of an infected car, cannot be applied as an everyday practice."

He objects to the woollen and stuff seats, as serious obstacles to sanitation and commends "Wood's woven wire spring seat, used by the Great Eastern railway and on some of the Highland railways." He says, that "it is easier to clean, is as soft as horse hair and wool, does not harbor dust, and is ventilated throughout. As the wire is galvanized and painted it can without injury be washed with soap and water. Whatever extra covering or cushion may be placed on this wire spring seat, should be of such oil-cloth or leather as to at least allow it to be wiped with a wet cloth." The tourist sleeping cars of the Canadian Pacific Railway approach pretty near the ideal of the English writer. There is no upholstery in them, excepting leather covered seats and backs, which are movable. They are accompanied as a rule by a special attendant, are treated in the same way as first-class sleeping cars and are thoroughly washed out at the end of each run with a hose.

It is quite likely, that the close smell noticeable in first-class day cars and sleeping-cars on Canadian lines is partly due to the woollen and stuffed seats and backs, which, in spite of frequent removal and beating, still retain the animal odors, emanating from the clothing and persons of their occupants. Until the people can be educated sufficiently to prefer health to seeming comfort and luxury, a well-stuffed seat, covered with red or green plush will be acceptable to more travellers than leather-covered seats and backs even with a wire spring seat beneath. It would be easy however to trim the seats of first-class day and sleep-

ing-cars in leather, which would be pleasing to the eye, and at the same time would lend itself, along with the woven-wire spring seat, to the purposes of a more effective sanitation.

The replies to the third question, relating to renovating and re-upholstering cars, show that that sort of work is done by all the railway companies about once a year. The Pullman Company claims to renovate its coaches in from nine to ten months, and the Wagner Company does the same for its coaches in from ten to twelve months. For this they are entitled to credit; but it is quite likely, that the extensive patronage accorded by the public to these American cars calls for relatively more frequent renovation, if the appearance of newness and freshness is to be preserved.

The replies to the fourth question, "What action do you take if an invalid occupies a berth?" are fairly satisfactory. This question was intended to elicit the methods adopted in cleaning a sleeping-car berth, which had been occupied by a tubercular patient.

Health authorities in Canada, nowadays, would not permit a patient known to be affected with smallpox, scarlet fever, diphtheria, measles or cholera to travel by day-coach or sleeping-car, and if by mischance such a case were to occur, the cleansing and disinfection of the car would be expected to follow as a matter of routine. Consumptives, however, occupy berths without hindrance. This may be due to a survival in the popular mind of the now antiquated idea that phthisis is a constitutional and not a contagious disease. Modern physicians, however, entertain a totally different opinion. Assuming that phthisical invalids are constantly travelling in sleeping-cars, the railway companies should provide sleeping compartments for their special use, so constructed that cleansing and disinfection could be rapidly accomplished. After a berth has been occupied by a consumptive patient the washable surfaces in and about the berth should be bathed with a solution of bichloride of mercury one part to a thousand of water, and subsequently scrubbed with hot water and soap. The soiled bed linen and blankets, after immersion in a mercurial solution of similar strength, should be boiled for at least an hour. The mattress and pillows, if soiled by the discharges from the patient, should be disinfected by super-heated steam. The curtains may also be disinfected by steam. If steam is not available, the curtains, pillows, mattresses and the woollen stuffs of the seat covers could be disinfected by the hand-pump spray used on the French railway lines in dealing with similar cases. The pump can be wheeled up to a railway carriage and, while one attendant works the pump handles, another with a hose directs a strong spray on the cushions, seats, etc. This spray generally consists of a bichloride solution, sixty grains to the gallon. A carbolic solution, carbolic acid (90% strength), seven ounces to one gallon of water would be equally effectual. Spittoons containing a solution of bichloride of mercury 1-1000 should also be provided in day and sleeping cars.

In the discussion which took place on the report of the committee on car sanitation A. P. H. A. at Denver, October, 1895, Dr. Kinyoum said that "the disinfection of a car could be accomplished in five or ten minutes by the use of the D'Arsonval spray," which we have just described. "The closets he thought should be disinfected by steam. The upholstery, cushions, backs, curtains, mattress, pillows, etc., can be thoroughly disinfected by an agent called 'formaline.' It can be absolutely depended upon to destroy the germ of small-pox in three minutes. It destroys the bacillus tuberculosis and diphtheria, even in the dried state and does little or no injury to fabrics, whether they are dyed with inorganic or organic colors. It is cheap. It can be applied in the form of fumes or by a special apparatus."

Dr. Conn, chairman of the Committee of Car Sanitation of the A. P. H. A., in closing the discussion said, that "formaline is a well known preservative, and like the bichloride of mercury, when dried, produces dust, which is irritating to the mucous membrane or any part of animal tissue. Dr. Conn had no doubt that it could be used as a disinfectant, but, owing to its irritating character, it would require a special plan of administration. He suggested, that the mechanic and sanitarian must work together, and in this way evolve something, which will be systematic and easily managed.

The replies to the fifth question, "Have you inspectors to look after the cleaning of your cars?" are fairly satisfactory. The ordinary cleaning of the cars is doubtless well attended to; but, in the hygienic interest of the travelling public, it would be well for the Canadian lines to imitate the Wagner Palace Car Company, who have a school, where, among other things, employes are instructed in the proper cleaning of cars.

The replies to the sixth and seventh questions indicate, that both the Wagner and Pullman Palace Car Companies run sleeping cars over the Grand Trunk line, and that the latter company has no sleeping cars, exclusively under its own control. This is a sufficient guarantee that the sleeping car service of the Grand Trunk railroad is conducted in a sanitary way; the method adopted in cleaning the sleeping cars exclusively under the control of the C. P. R. are however quite as thorough as those used on the American lines.

The replies to the eighth question, relating to methods of heating coaches, show that they are heated by hot water, through the medium of the Baker heater, in which the water is heated, either by a coal fire or by steam from the locomotive. The method of heating hot water by a coal fire should be abandoned, owing to the holocausts, which occasionally occur in connection with railway accidents. Heating by means of electricity would be very desirable; but steam is cheaper and should be preferred on that account, as it would help along the introduction of artificial ventilation in cars.

The ninth question is, "What are your methods of lighting carriages?" The Grand Trunk replies "oil," and the Canadian Pacific Railway says, with a few exceptions where Pintsch gas is used, "oil." This is certainly not as it should be. Oil is a poor illuminant and adds to the horrors of a railway accident. In many instances the light is altogether deficient. Time is precious and much reading has to be done in railway carriages; the eyesight of many travellers has doubtless been permanently injured by the insufficient light in these carriages.

The Chesapeake & Ohio Railway Company lights its cars by the use of storage electricity, each car being independently lighted and charged for continuous lighting by storage batteries for thirty-six hours.

The replies to the tenth question, relating to the precautions taken to secure pure water for potable use in railway carriages are practically identical, and show that both Canadian companies are alive to the necessity of obtaining a pure water supply.

A perusal of the answers will doubtless convince the public that the interests of health are not only not neglected but safeguarded on the Canadian railways. It may even be said, with perfect fairness, that if a few improvements, such as have been suggested in this paper were made, travellers in Canada would enjoy better hygienic conditions in railway carriages than in many public or even private buildings.

All of which is respectfully submitted.

Committee	}	J. J. CASSIDY, P. H. BRYCE.
on		
Ventilation,		

VI.—REPORT OF THE COMMITTEE ON VENTILATION *RE* VENTILATION OF PUBLIC BUILDINGS.

To the Chairman and Members of the Provincial Board of Health :

GENTLEMEN,—It is a source of satisfaction to learn, that, in the State of Massachusetts, the ventilation of public buildings and school-houses has passed beyond the theoretical stage. In that State statutes were passed, in the year 1894, regulating the construction, ventilation and sanitary conditions of buildings, and it is the special business of the Department of the Inspection of Factories, Workshops and Public Buildings to see that the regulations, imposed by those statutes, are promptly carried out.

In a Massachusetts statute, entitled chapter 508, the following regulations are made :—

“Section 40.—Every public building and every school-house shall be kept in a cleanly state and free from effluvia arising from any drain, privy or other nuisance, and shall be supplied with a sufficient number of water closets, earth closets, or privies, for the reasonable use of the persons admitted to such public building or of the pupils attending such schoolhouse.

“Section 41.—Every public building and every school-house shall be ventilated in such a proper manner, that the air shall not become so exhausted as to be injurious to the health of the persons present therein. The provisions of this section and the preceding section shall be enforced by the inspection department of the district police.

“Section 42.—Whenever it appears to an inspector of factories and public buildings, that further or different sanitary provisions or means of ventilation are required in any public building or school-house, in order to conform to the requirements of this Act, and that the same can be provided without incurring unreasonable expense, such inspector may issue a written order to the proper person or authority, directing such sanitary provisions or means of ventilation to be provided, and they shall thereupon be provided, in accordance with such order, by the public authority, corporation, or person having charge of, leasing, or owning such public building or school-house.”

On printed form No. 83 the following requirements are called for in the heating and ventilation of school buildings in Massachusetts :—

“1. That the apparatus will, with proper management, heat all the rooms, including the corridors, to 70° F. in any weather.

“2. That, with the rooms at 70° F. and a difference of not less than 40° F. between the temperature of the outside air and that of the air entering the room at the warm-air inlet, the apparatus will supply at least 30 feet of air per minute for each scholar accommodated in the room.

“3. That such supply of air will so circulate in the rooms, that no uncomfortable draughts will be felt, and that the difference in temperature between any two points on the same breathing plane, in the occupied portion of a room, will not exceed 3°.

“4. That vitiated air, in amount equal to the supply from the inlets, will be removed through the ventiducts.

“5. That the sanitary appliances will be so ventilated, that no odors therefrom will be perceived in any portion of the building.”

"To secure approval by the department of plans, showing methods or systems of heating and ventilation, the above requirements must be guaranteed in the specifications accompanying the plans."

Fully recognizing the wisdom of the above mentioned statutes and the propriety of the regulations founded on them, your committee, in order to ascertain whether the conditions of heating and ventilation in Toronto are conformable to the legal standard required in Massachusetts, examined the ventilation of three public school-houses, two Sabbath Schools, and the city Police Court. The following is the report of the work done :—

Report on the ventilation of two rooms in the Church St. school-house, corner of Alexander and Church Streets, Toronto. Date of inspection December 17th, 1896. Weather overcast and mild; wind southeast; temperature 33.8° F.; humidity 61%; barometer 29.85. This building is heated and ventilated by the Smead-Dowd apparatus. It is a twelve room school, three stories in height, and there are four furnaces, one for each corner of the building, each furnace heating and ventilating three rooms.

Room No. 2, ground floor, southwest side; seating capacity 63; present 61; net air space 11,368.67 cubic feet; air space per head 186.37 cubic feet; temperature at teacher's desk 68° F.; humidity 49%; difference in temperature in different parts of the room at the breathing line 5° F.; air supply at inlet 1,630 cubic feet; air removed at outlet per minute (estimate) 1,630 cubic feet; amount of air supplied to each pupil per minute 26.72 cubic feet; air changed completely in 6.96 minutes; carbonic acid parts in 1,000 of air .537; time of test, 2.55 p.m.

Room No. 4, ground floor, northeast side; seating capacity 64; persons present 50; net air space 11,738.17 cubic feet; air space per head 235.66 cubic feet; temperature at teacher's desk 67° F.; humidity 55%; difference in temperature in different parts of the room at the breathing line 3° F.; temperature of the air at the inlet 71° F.; air supply per minute 1,650 cubic feet; air supply at outlet per minute (estimate) 1,650 cubic feet; amount of air supplied each pupil per minute 30.8 cubic feet; air changed in 7.14 minutes; carbonic acid parts in 1,000 of air .537; time of test 3.20 p.m. The fires were getting low, and the results obtained would probably show the average of all kinds of weather.

Report on the ventilation of two rooms in the Louisa St. school, Toronto. Date of inspection December 18th, 1896. Weather generally clouded; wind south; temperature 26.9; humidity 92%; barometer 29.389. This building is heated by box stoves in which wood is consumed. There is a fresh air inlet in connection with each stove, but the supply of fresh air is merely nominal, the ventilation being accomplished by open fanlights in the windows.

Room No. 1, ground floor, on the south-east side; seating capacity forty-five; persons present forty; net air space 11,636.25 cubic feet; air space per head 290.90 cubic feet; temperature at the teacher's desk 61 F.; humidity 60%; difference in temperature at different parts of the room at the breathing line 13° F.; temperature of the air at the inlet (fanlight) 42 F. The fresh air inlets were two open fanlights, having an area of 6.72 square feet. The wind was blowing towards them, but as there was no definite inlet or outlet, I did not ascertain the amount of air supplied per minute or the amount removed. Carbonic acid in parts of 1,000 of air .806; time of test 11 a.m. It had begun to rain when the next room was tested.

Room No. 2, ground floor on the north-west side; seating capacity sixty-four; persons present fifty-eight; net air space 10,365.42 cubic feet; air space

per head 178.71 cubic feet: temperature at the teacher's desk 59° F.: humidity 71%: difference in temperature in different parts of the room 5° F.: temperature of air at inlet 42° F.: fresh air inlets five open fanlights representing 16.75 square feet: carbonic acid in parts of 1,000 of air .615. As the fanlights were all open and the room was filled with fresh air, this cannot be considered a test of the ventilation of this room.

Report on the ventilation of the Sherbourne St. Methodist Sablath-School, Toronto. Date of inspection December 20th, 1896. Weather very cloudy: wind south: temperature 30.9: humidity 59.0%; barometer 29.561. This is a large room with galleries, formerly used as a church: seating capacity 350: persons present 25: area 65,920 cubic feet: area per capita 263 feet: temperature at the desk 64° F.: carbonic acid in parts of 1,000 of air .806 at the first test: at a second test I found .537: time of test 3.30 p.m. This room is heated by a Sinead-Dowd furnace. Fresh air is propelled through the furnace by a forty-eight inch fan, which is driven by an electric motor. The fresh air enters by eight inlets high up on the walls, and is extracted at the level of the floor, brought to a gathering chamber, and expelled by a forty-eight inch extraction fan. The extracting fan was said to be making about 200 revolutions per minute when I obtained .806 carbonic acid. It was said to be making 400 revolutions per minute when I obtained .537 carbonic acid. January 26th, 1897, 10.45 a.m., I tested the ventilation of the Sherbourne St. Sabbath-School, only two persons being present. Temperature at desk 70° F.: difference in temperature in different parts of the room at the breathing line 4° F.: temperature of air at inlet 100° F.: temperature of air at outlet 66° F.: area of combined fresh air inlets eight and one-half square feet: revolutions of propelling fan 160 per minute: revolutions of extracting fan 160 per minute, air propelled through inlets per minute, average, 520 linear feet: this multiplied by the area of the inlets, 8.50 square feet, equals 4,420 cubic feet per minute or 17.68 cubic feet, per head, per minute, for 250 persons. Air removed at outlets 530 linear feet per minute, equalling 270,300 cubic feet removed per hour. This last sum divided by the total area, 65,920 cubic feet, shows that the air of the room was being changed at the rate of 4.1 times per hour. Assuming that thirty cubic feet of fresh air ought to be supplied, per head, per minute, and that 250 persons were present in this room, we find that instead of receiving 7,500 cubic feet of air they would get 4,420, or 58% of the proper quantity. This probably accounts for the large amount of carbonic acid present in the air on December 20th. If the propelling and extracting fans were made to work more actively, there would be no difficulty in introducing the proper amount of fresh air, although in cold weather it would take more fuel to heat the room.

Report on the ventilation of the Central Methodist Sabbath-School, corner of Bloor St. East and Park Road, Toronto, December 26, 1896. Weather cloudy: wind south-west: temperature 30.2: humidity 71%: barometer 29.945. The room is situated on the first floor and has a gallery: area 70,000 cubic feet: persons present 500: area per capita 140 cubic feet: temperature at the desk 61° F. Two warm air furnaces supply the heating, and there are ten warm air inlets in the room, most of which discharge at the floor: net inlets 7.81 square feet. Two outlets on the wall and two in front of the stage: net area 1.51 square feet: 650 one-half inch holes in perforated boards, placed in ceiling and connected with two outlet tubes, which discharge through the roof: net area 1.42 square feet. The ceiling ventilators were closed. No estimate of amount of air supplied. Carbonic acid in parts of 1,000 of air, .806 at the floor: in the gallery 1.61: time of test 3 p.m. The room was crowded, the doors were closed and the windows closed and darkened, as a magic lantern exhibition of scriptural subjects was being given at the

time the test was made. On February 9th, 1897, I estimated the amount of fresh warm air, which entered this room, the conditions as to heating and amount of outlet being similar to those which obtained on December 26th, 1897. The supply amounted to 70,260 cubic feet of fresh air per hour, or about one change of air in an hour.

Report of the ventilation of the Police Court, Court St., December 28th, 1896. Weather cloudy and hazy; wind south-east; temperature 23 F.; humidity 99%; barometer 30.259. First floor, north side; area 20,240 cubic feet; persons present 165; area per head 122.50 cubic feet; temperature at the desk 67° F. The room is warmed in cold weather by four steam radiators. Four circular pipes, six inches in diameter, enter the room about thirteen feet from the floor. They are intended to act as inlets for fresh air. There were two large outlets, each having an area of 256 square inches, one grate flue having an area of twenty-one square inches and another of similar size, which was bricked up. Two small windows near the ceiling were open. Three doors were open, two of them double doors, opening on the main corridor near the head of the stair-case, which starts near the street door; the third door opened into the magistrate's room. There was also in the centre of the room an open stair-case, leading from the ground floor, through which the prisoners ascended. The available area was thus very much larger than the figures given—20,240 cubic feet, would indicate. Carbonic acid in parts of 1,000 of air, first test .537; after the three doors had been closed for fifteen minutes, the two windows and central stair-case remaining open, carbonic acid in parts of 1,000 of air, .806. February 6th, 12.30 p.m., I estimated the natural ventilation of the Police Court, the doors, windows and the trap door over the stair-case being closed. Only two persons were present. The discharge of air by the outlets was as follows:

By 1 outlet	30,798.00	cubic feet per hour.
“ 1 “	24,426.00	“ “
“ 1 grate flue.....	1,828.26	“ “
“ 1 bricked up flue.....		
“ 2 cold air inlets, which acted as outlets	5,771.28	“ “
Total air discharged.....	62,823.54	“ “

The indraught of air was as follows:

By 2 cold air inlets	5,771.28	cubic feet per hour.
By loosely fitting doors and trap- door, and the spaces beneath the doors and around the windows (estimate).....	57,052.26	“ “
Total air introduced	62,823.54	“ “

The amount of air introduced in an hour, 62,823.54 cubic feet, divided by the area of the room, 20,240 cubic feet, would show that the air was changed 3.1 times in an hour. Allowing thirty cubic feet per minute or 1,800 cubic feet per hour to each person present, such an area, doors and windows being closed, would properly accommodate thirty-four persons, each of whom would then have an area of 600 cubic feet.

Report on the ventilation of a room in the Dufferin school, Berkeley St., Toronto, January 7th, 1897. Weather cloudy; wind south; temperature 27° F.;

humidity 67%; barometer 29.891. Room 8, third floor, east side; seating capacity fifty-eight; persons present forty-nine; net air space 12,163.83 cubic feet; air space per head 284.24 cubic feet; temperature at the teacher's desk 69° F.; difference in temperature at the breathing line over the greater portion of the room 1 F.; temperature of the air at the warm air inlet 128 F. Two window sashes were lowered at the top, one eight inches the other five inches. There was a large foul air duct in one corner of the room, the shaft of which was heated by steam coils: the available area of its opening in the room was 4.27 square feet. When the door and windows were closed 320.25 cubic feet per minute were removed through this opening, or 19,215 cubic feet per hour. Fresh air supply at the inlet 600 cubic feet per minute or 36,000 cubic feet per hour. Amount of pure warm air supplied, per minute, per head, 12.24 cubic feet. Amount of foul air removed, per head, per minute, through the ventiduct 6.53 feet. When the windows were opened, there was no current in the foul air outlet. The open windows acted both as inlets and outlets, but the amount of air introduced and extracted by them was not estimated, as the supply was irregular and capricious. Carbonic acid in parts of 1,000 of air .826: time of test 3.15 p.m. The warm air supplied was insufficient in quantity and of too high a temperature, so that cold air had to be introduced in an irregular fashion to supply the deficiencies under both these heads. Even with the open windows, the supply of fresh air was small, as was proved by the amount of carbonic acid in the air. The high temperature of the warm air at the inlet, ranging from 120° to 150° F., made it difficult for pupils to occupy the corner where the register was situated. As the air of the school room became superheated, the windows had to be opened, allowing a considerable waste of heat. This room is heated but cannot be ventilated unless the windows are opened.

Dufferin school is an eighteen-room school-house. Sixteen of the rooms are heated by steam pipes, direct and indirect. The indirect heating consists of pure air, warmed by passing over steam coils in a shaft situated in the basement, and introduced into the room by a register. In very cold weather direct steam coil heating is superadded. In each of these sixteen rooms is a foul air outlet, heated by steam coils; net area of opening 4.27 square feet. In two rooms there are no warm air inlets, the heating being effected by direct steam coils. These latter rooms are provided with skylights, which may also be used as outlets for air. The combined outlets of the north wing of the building discharge through a large covered outlet, about four feet above the roof of the north portion of the building. Similarly the combined outlets of the south wing discharge above the roof of the south side. Tested at the roof these outlets seemed to discharge a considerable amount of foul air; but the test made in room 8, which is circumstanced in a manner similar to the other fifteen rooms, shows that these outlets remove only a small percentage of the foul air.

Your committee submits, that, of the six buildings examined, the only one, which could be considered as satisfactory in the matter of ventilation was the Church St. school. In room 2 of this building there was slight overcrowding, and the amount of air supplied each pupil per minute, viz., 26.72 cubic feet, was below the standard. The difference in temperature in different parts of the room at the breathing line, viz., 5° F., was too great, but some of the thermometers were placed near windows. In room 4 the conditions were all quite satisfactory, the amount of air supplied per head per minute being 30.8 cubic feet, and the difference in temperature in different parts of the room at the breathing line 3° F.

At Dufferin school the heating was sufficient, if anything the temperature was rather too high; but the supply of pure air at the inlet was defective and was supplemented by the opening of windows.

At the Louisa St. school-house in room 1 the difference in temperature in different parts of the room, viz., 13°, was excessive, and the ventilation, depending on the open fanlights, was draughty.

At the Sherbourne St. Sabbath-School the heating was good, but the supply of pure air was not sufficient. This defect could be easily remedied by making the fans work more briskly.

At the Central Methodist Sabbath-School the heating was satisfactory; but the fresh air supply was insufficient. The room was also overcrowded. Increased inlets and outlets, with the use of fans, would produce good ventilation in this room, but the heating would require to be changed to suit the new conditions.

The ventilation of the Police Court, with several doors and windows open, cannot be seriously considered. If doors and windows were closed, the room is altogether too small for the large number of persons, who assemble there every day, when business is transacted.

For services rendered during the preparation of this report, your committee desires to express grateful acknowledgments to Mr. W. F. Rutley, Secretary of the "Smead-Dowd Warming and Ventilating Company," Mr. R. F. Stupart, Meteorological Observatory, and Mr. C. H. Bishop, Superintendent of Buildings, all of Toronto, and also to Mr. John F. White, State Inspector of Public Buildings, Boston, Massachusetts.

Respectfully submitted,

J. J. CASSIDY,
P. H. BRYCE.

VII.—REPORT ON ST. MARY'S WATERWORKS.

To the Chairman and Members of the Provincial Board of Health :

GENTLEMEN,—Your Secretary according to instructions visited the town of St. Mary's, and with Dr. Matheson, representing the local Board of Health, examined the several proposed sources of supply for public water for the town.

There are several available sources of supply :

- 1st. Trout creek.
- 2nd. The Thames river.
- 3rd. Springs in the banks of the Thames.
- 4th. Artesian wells bored into the rock.

The plan drawn up by Mr. Newman, C. E., for a supply from Trout creek has not been adopted by the town council, nor has any other scheme been submitted to it yet for approval. Any of the several sources would probably be found to be a safe water supply if properly dealt with; but your Secretary has no opinion to express until some definite scheme adopted by the council is laid before the Board for approval.

All of which is respectfully submitted.

Your obedient servant,

P. H. BRYCE.

VIII.—REPORT ON DRAINAGE OF BURGESS LAKE, BLENHEIM TOWNSHIP, OXFORD COUNTY.

BY THE SECRETARY.

Mr. Chairman and Members of the Provincial Board of Health:

GENTLEMEN,—Having received several communications, and finally a petition signed by some twenty ratepayers of Blenheim township, protesting against the action of the township council in passing a by-law to drain an area of land which included Burgess lake, of some fifty acres extent, your Secretary arranged to visit Drumbo on November 23rd, and in company with Messrs. Barwick & McLaren, two of the petitioners to your Board visited the lake.

The accompanying diagram on page 62 will give the Board an idea of the situation.

Over these South Midland counties lie what are known as the post-glacial deposits of Saugeen sands and gravels, overlying the Erie clays. The surface being rolling, it naturally happens that in the valleys of erosion, practically the watercourses, there are often basins in the clay which receive the subterranean waters from the surrounding permeable upper soils, and so form small lakes usually with much black humus in the bottom. These lakes, as would be expected, are usually shallow, the humus or black muck extending to the shores, and as the waters retire in the summer, the margin becomes to some extent uncovered. Often, too, there is considerable wet land or swamp around the lakes.

Burgess lake, with a small stream running into its northwestern end, and out of its east end, is a lake of this character (See diagram on next page.)

The course of the creek from the outlet is tortuous, running southeasterly to Smith's creek, thence to the Grand river. As the clay throughout this course comes near the surface in many places, the farmers along the creek wished to have a township ditch dug under the terms of the Ontario Drainage Act, to widen and deepen the valley of this creek and so improve the local drainage, as several owners of the land around the lake signified their willingness to join the scheme. The council adopted a by-law, a copy of which is herewith presented, with as expressed therein the ends of:

- 1st. Draining certain farms or lots in the township.
- 2nd. Deepening, straightening and widening the creek.
- 3rd. Lowering the waters of the lake.

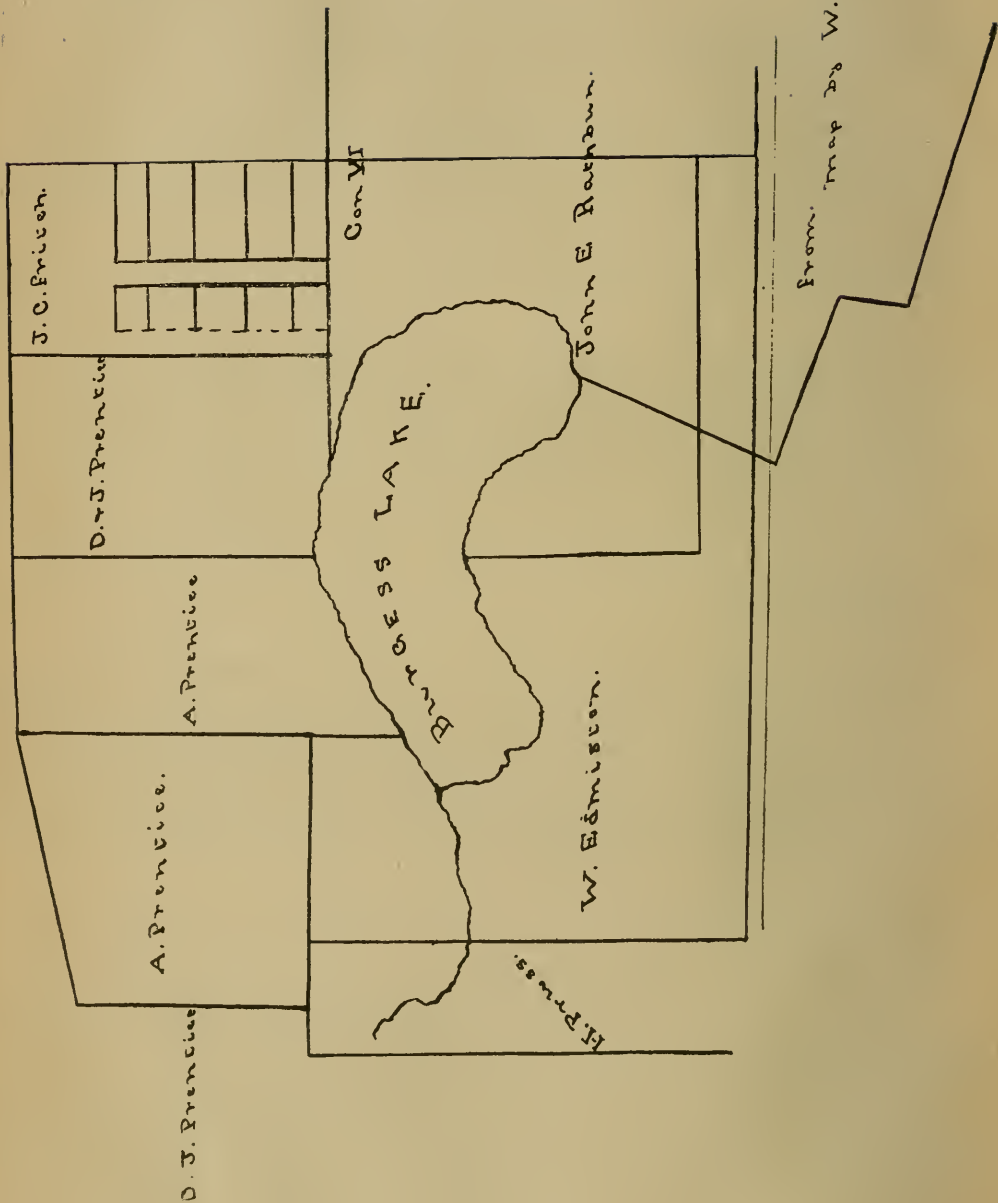
It may be stated that the preliminary surveys and estimates of costs have been made by Mr. M. Davis, C. E., and the by-law was adopted in October, appeals heard and contracts let.

The objections of the petitioners are as set forth in the petition:

1st. That the lake has a depth in some places of at least twenty feet, and that the drain is to be but five feet in depth.

2nd. That it is believed that the result of the exposure of the muck would cause the prevalence of typhoid, diphtheria and ague.

3rd. That the council did not delay the passage of the by-law until an opinion of the Provincial Board of Health was obtained.



Remembering that it is the only sheet of water near Drumbo, it is not to be wondered at that the villagers and some of the farmers do not wish to see the lake disappear both because it is quite pretty, even though shallow and containing very few fish at present. This argument is important, but probably does not come greatly under the purview of the Board, although æsthetics may probably be considered in their influence upon public health.

The point is made with apparent force, that if the lake is drained, much black muck and swamp will be uncovered and fevers will ensue. This would be true if the waters of the lake were lowered in warm weather. But this danger can be largely overcome by lowering the waters in the autumn, when, if the drainage is effective, and the waters of the lake deep enough, the surface will gradually dry and no great danger of malaria would be apprehended.

It is further objected that ponds will be left owing to the uneven bottom of the lake, and that small ponds will occur where now there is one large area of continuous water obviating the danger by keeping the muck covered.

The evidence of several persons well acquainted with the lake seems to agree that there will be a number of such ponds left. The engineer has stated that if such be found to exist, the township will naturally be expected to connect them so as to have a current of water flowing through them as a part of the creek. While springs do maintain the lake pretty nearly to its present height in the summer months, still as the outlet creek at present is dry in summer and not very much water comes in then from the creek above, it is probable that the ponds will not have their water renewed, but become more or less stagnant ponds.

Another point may be noticed here, namely, that the lake at present acts in spring and flood seasons as a reservoir, and as the outlet of the lake will, if drained, be lower, it may be found that temporarily in spring the lands below will not be free from spring overflows. It is also agreed by all observers that the very considerable acreage of tamarack forest on the low lands around the western end of the lake will be destroyed by a lowering of the lake water, and the owner thereof would seem to have a right to damages for injury due to such results. Inasmuch as at least half of the owners around the lake object to its being lowered, and as there seems only one who has some thirty acres of low land at the east end who is anxious for the drain, it becomes a matter of consideration whether the drainage of this particular lot is to be made at the expense of what others believe will be a direct injury to as many or more acres of wooded land. It would on the other hand probably be found that by extending the drains along both sides of the lower end of the lake, a considerable area of the Rathbun land might be well drained. From the various facts referred to, viz.:

1st. Inasmuch as the drain can be carried up its full width and depth so as to give relief to all the lands below the lake.

2nd. That as at least some of the Rathbun land can be drained without lowering the lake.

3rd. That in view of the fact that several owners of lands around the lake are strongly opposed to its drainage, and as one may with much reason complain that his woodland will be injured in value.

4th. That as the villagers and local residents who for many years have become attached to the little lake, are loath to see it removed.

That it would appear advisable in order to avoid litigation the council may, while continuing the drain as at present, very properly desist from lowering the lake, while giving those residents around the lake who wish further drainage at least partial relief in the way herein suggested.

All of which is submitted.

(Signed

P. H. BRYCE.

IX.—REPORT OF COMMITTEE ON SEWERAGE *re* GALT MAIN STREET SEWER.

TORONTO, June 8th, 1896.

Mr. Chairman and Gentlemen :

Your committee on sewerage and water supply, represented by Dr. Kitchen and Bryce, visited Galt on May 28th, in response to complaints made by various parties, and notably by the council of North Dumfries, with regard to the proposal before the Galt council to construct a "Sanitary Drain" along Main street, Galt, and empty the same into the Grand river without filtration.

It was arranged by the committee that they should meet a deputation of the North Dumfries council on the above date, and discuss with them a method of disposal of the sewage from the proposed Main street sewer, the outlines of which had been suggested by your Secretary to Dr. Wardlaw, the Medical Health Officer of the town, and the details of which had been prepared by the town engineer, Mr. McPherson.

The plans referred to are presented herewith.

Briefly described the plan provides for :

1st. The construction of a receiving tank built within the retaining wall of the river bank of masonry and divided into two compartments, which by a mechanical arrangement will receive alternately the sewage during, it is estimated, 4 or 5 hours of the heaviest flow during the morning and afternoon.

2nd. Of a tank with two compartments, in which lime water will be prepared from a caustic lime or quick lime, and which will hold enough for at least 24 hours' supply.

3rd. The required amount of precipitation of average sewage is five grains of hydrate of lime for every gallon of sewage, according to English standards, and this has been recommended for adoption. As every ounce of water will dissolve 0.62 grains of caustic lime, there will be required about 10 ounces of lime water to be mingled with every gallon of sewage.

As the two tanks together will hold 7,500 gallons of sewage twice in 24 hours, about 1,000 gallons of lime water will be required. It will be mingled with the sewage just before it passes into the tank.

4th. As there are 33 cellars on the north side and 30 on the south side of Main street, and amongst these but six houses and four hotels where the families reside over night, the population to be provided for will not exceed 350. This at 50 gallons per head would mean 17,500, which will for a long time exceed the amount of sewage from the area sewerred, since provision is being made for the ground water being carried away by drain tiles.

5th. Provision is made for the emptying of the sewage tanks by siphonage, the sewage being turned from one compartment to the other by an automatic mechanical device, the sewage of the filled tank being allowed to precipitate during the time of filling it, and also during the time of filling the other, or probably from 8 to 10 hours each.

The sludge may be removed by entrance through the manhole or by a valve.

6th. Provision will be made for carrying away the sludge regularly and ploughing it in on the town dump.

Your committee, while regretting that the by-law submitted to the people in August, 1895, providing for the construction of a more extended sewerage system, and for carrying the sewage to the sewage farm provided in the plans of Mr. Chipman, C. E., was defeated, believes it to be in the best interests of the public health to encourage the desire of the town council at Galt to begin their sewerage work, which is simply utilizing a part of the general plan of Mr. Chipman, and believes, while the plan for the precipitation of the sewage, as prepared in the plans submitted, will be effective in preventing any nuisance arising if systematically attended to under the supervision of the town engineer, that by allowing this the town will so much the sooner continue to develop the sewerage of the whole town.

The matter having been fully discussed, and the proposed plans for dealing with the sewage of Main street sewer having been explained, the reeve and members of the council of North Dumfries, with their Medical Health Officer expressed their satisfaction at the plans, and their acquiescence in any scheme which will assist Galt, so long as it does not pollute the waters of the river in the township.

Your committee would therefore recommend the approval of the Provincial Board of the methods proposed by the town council of Galt for disposing of the sewage of Main street, as set forth in the report and in the plans thereof, and explanations submitted herewith, on the express condition and understanding that any neglect of the tanks or other part of the works on the part of the town whereby a nuisance is created shall be considered as a forfeiture of this Board's approval, and a violation of section 3 of the Public Health Act of 1895; and also that the town council submit a plumbing by-law for approval, satisfactory to the Provincial Board of Health, the adoption of which thereafter shall be a necessary part of the system of sewerage approved of by this Board.

All of which is respectfully submitted.

(Signed)

P. H. BRYCE.
E. E. KITCHEN.

X.—REPORT OF COMMITTEE OF SEWERAGE ON BERLIN SEWAGE FARM INSPECTION.

To the Chairman and Members of the Provincial Board of Health:

GENTLEMEN,—Your committee begs to report that Drs. Kitchen and Bryce, two members thereof, visited German Mills and Berlin on May 27th, on complaints which had been made at different times during the past two years by the local Board of Health of Waterloo township, to the effect that the sewage of the town of Berlin was polluting the Berlin creek, creating a nuisance as far down as German Mills, and destroying the fish with which the German Mills creek has been stocked.

The committee was met by Reeve Shantz, Mr. Sipes, Chairman of the Local Board, Mr. Tie, Secretary of the Board, and Mr. Rice, V.S., Sanitary Inspector of the Board, and together inspected the creek and pond which were in flood after the heavy rains of the night of the 25th. The waters were turbid with clay, but no nuisance was perceptible along the creek. The party thereafter drove to

Berlin, and having notified the mayor and town representatives, met in the afternoon of the 27th in the town hall, the mayor, the Chairman of the Committee of Parks and Gardens, and the following information for the several witnesses was obtained :

Mr. Shantz, Reeve of Waterloo, sworn—he was elected in January.

Complaints to council and local Board of Health were made at town meeting by A. Cressman and J. Snider, John Williams, J. Mayer and others, that there was a bad smell along the creek, at different times : and that the fish in the creek and pond were being killed ; also that certain refuse was in the creek. They believed that the gates at the sewage farm were at times raised, and the sewage allowed to flow directly in the creek.

They urged that the council take action in the matter, or that they, the sufferers, would hold council responsible.

About the beginning of March, I visited the sewage farm, and found a large amount of stuff coming down on to the farm, much worse than to-day, but saw nothing going into the creek.

The council has not this year formally notified the town sewer committee, but requested that a meeting of the two boards be held. There has not yet been any meeting. No other steps besides notifying the Provincial Board of Health have been taken this year.

Mr. Sipes stated that he had been a member of the local Board for four or five years, and our attention has been called at different times by those along the creek to the apparent nuisance along the creek.

Last fall I was notified to examine the creek by German Mills people, and I noticed a considerable stench at the mill, both in the race and in the mill up to the pond. They stated that they had appointed individuals to watch the sewage farm, and they saw the gates raised at night, letting sewage flow directly into the creek. There was refuse along the creek. Mr. Stabler was seen by me, and stated that he knew nothing about this, but he would look into the matter and see that it would be stopped. The local Board have been patient, hoping that the farm would soon get into working order. The new beds were constructed two years ago. They said they might at times overflow, as the banks or dykes had not all been made.

I visited the beds last March with Mr. Shantz, and found conditions which led us to suppose sewage had been allowed to flow direct into the stream.

Dr. Roberts, of New Germany, had been Medical Health Officer for three years, had been at sewer farm, but not down the creek. During these years there have been continued complaints, and they have written for several months to me. As the reeve lived near, I being far away, I called his attention to the matter. I may say that the clerk has been instructed several times to draw the attention of Berlin council to the matter. The complaints have been made so long that soon our Local Board of Health will be a laughing stock, if no action is taken. I was at sewage farm last year, and found evidence then of sewage going into the creek. The complaints still increase ; last made in March.

In reply to Mr. Bowman, Dr. Roberts stated the flow from the tiles was clear, but he thought, perhaps, there was not enough of beds.

No analysis of water in creek above and below sewage farm have been made. I am thoroughly in accord with the principle of the farm, and if carried out would be a good idea.

Mr. Bowman asked, and in reply Dr. Roberts stated that he thought all the sewage should be kept out of the creek in the summer, and also in the winter, as the sewage would be in the ice.

Q. Do you think it would hurt health? If allowed to go on undisturbed, would coal tar products, spent dyes, etc., be injurious to health under the circumstances? I do not think they would. I do not know whether such would kill fish or not, but do not think stock would drink it if pollution were great enough.

Mr. Rice, Sanitary Inspector and veterinary surgeon, has been inspector for six or seven years.

Ever since I have been Sanitary Inspector I have had complaints from these people along the creek, both before the sewerage works were put in and since. Complaint was of stench, refuse, dead fish in creek. Some say they would not water stock except under compulsion. Have never known of cases of sickness in stock along creek. I have every year crossed the farm below the sewage outfall. I found things working nicely, but it was generally in June or July. I have never seen the beds being cultivated, but appearing similar to what they were to-day.

I have heard from others (as Mr. L. Ernst I. Meyer) that they have seen the gates raised and the sewage allowed to flow out. We have not established any case of disease, as being caused along the creek. It is apparently all right in dry weather.

Mayor Breithoff stated himself to have been in council at different times, and was chairman of the sewerage committee when system was first constructed, and when sewage farm was made.

The idea was to prepare enough of beds for sewage purposes, and to keep adding as many as the case required. Bought 20 acres at first, and prepared 6; have since prepared about six more acres.

We have found that the old beds did not filter the water as fast as we expected, but found the new beds better. These will take continually more water from being more level, and subsoil tiles not so deep, and trenches are filled with coarse sand, where trenches over tiles at first were filled with material of field soil.

We can have water six inches deep over whole surface, and new ones and old ones would overflow before they are covered. Old ones are not completely improved yet. We had a meeting this spring which was important in this matter. It was decided then to improve old beds, and raise banks on new beds for more water to be put in.

Only one man is employed to take charge of beds. We supply more when necessary. The use of an extra help is determined by the committee.

The council has had a communication from township this year. I have known of complaints from time to time, but was of the impression that it was mostly from those having the fish ponds. I knew nothing of the facts. There have been attempts to cultivate the land, with fairly good success, as cabbages and roots to fully an acre were grown. The committee were of the conclusion that we could not dispose of as much sewage with, as without crops. Special advantage of deep beds, is to hold supply over night. We have not utilized the poor labor in any charitable way yet. The town has always been anxious to remove all cause of complaint.

Mr. Jansen, Chairman of Committee on Sewerage of Town Council, not on Local Board of Health. Have been in council for eight years, and on the com

mittee for two years. Was appointed chairman this year for first time. I think the statement ought to be made, that the disposal of sewage on land, is at best, but an experiment in this country or on this continent, and of course we have learned the lesson by experience and found that extensive cropping on a limited farm is not feasible. I have not seen the London asylum sewage farm. I think that a large area of beds of pure sand would be necessary for extensive cropping.

The committee have decided that we would not do so much cropping this year in order to dispose of more sewage.

We cannot flood so deeply with cropping as without, on the broad irrigation principle. Mangolds have been found profitable in sowing in ridges.

I have instructed that care be taken to allow no sewage to run into the creek either day or night. I told caretaker to distribute to these beds that take up least in day and those taking up most in night. The town is now disposing of 300,000 gallons a day, or 25,000 gallons per acre.

We have hired caretaker to do ploughing, flooding of beds, and hired team as often as may be required by committee.

Since beginning of year, beds have been ploughed once, then harrowed : not cultivated since. If we flood all the beds every day a crust will not form readily by baking but the suspended matters of the sewage, filling up the pores will after a certain time prevent the full amount of sewage from going into the soil.

Of course the rapid filtration of the water through soil, is the best method of avoiding any danger of complaint of local nuisance. I think it would be an improvement in every way, to run the cultivator over the beds between times of ploughing.

With regard to the statements that sewage is turned into the creek at night in winter time, or at other times, I have never seen any sewage turned into the creek, but have never gone down at night. •

The caretaker leaves at 8 p.m. in summer, but not later as a rule. I have found caretaker very reliable. There is a possibility of floating matter within the limits of the town getting into the creek.

It is my opinion that if no sluices are left open, to allow of flow of sewage directly into the creek, that the beds are sufficient to prevent any contamination of the creek with sewage.

The complaints made in the end of March, might have been caused by a breakage in the trunk sewer in the park, on a quicksand bar ; when the sewage had necessarily to go into the stream for a month.

From the information obtained, it is evident, to your committee

1st. That the township authorities have patiently and reasonably endured what complaints made to them state to be a serious nuisance from the towns allowing sewage to escape from the sewage beds, or from the carriers at the farm into the creek.

2nd. That the town authorities have, with a view to economy, supplied very inadequate assistance in the management of the sewage farm, and there would seem no ground to doubt, but that this has resulted in the nuisances complained of.

Your committee being satisfied on these points, begs therefore to recommend for the approval of the board,

1st. That the town council and local Board of Health, of Berlin, be instructed to adopt sufficient and adequate means, whereby the whole sewage will be carried to the farm, and be so applied on the beds in succession, that a proper and rapid filtration of the same will take place before any effluent is allowed to go into the creek.

2nd. Inasmuch as rapid filtration is the condition whereby any danger of local nuisance from decomposing sewage at the farm may be avoided, it is advised that the grade of the beds be improved, so that the sewage will be distributed equally over a bed, or on the ditches, should such be constructed.

That with a view to obtaining the most rapid filtration, the practice be adopted of cultivating or otherwise stirring the surface of the beds, after every two floodings at least, and preferably after every flooding.

3rd. That as the weather grows colder, arrangements of plots should be made with an idea of flooding smaller areas, so that a good depth of sewage may be rapidly attained thereby; having the specific heat of the sewage retained as long as possible.

4th. It would be most desirable, if one or more acres, of say two feet of sharp sand or fine gravel beds, were made with five inch tiles, laid ten inches under the surface, practically on the level, and in rows as close as one tile in three.

By a rapid delivery of sewage under the surface, from the covered carrier, a large amount will be rapidly disposed of, its specific heat retained and work done effectually to an extent not possible by any other method in winter.

Should these several recommendations be gradually introduced, with at the same time keeping steadily in view, the making the farm productive, there will no be reasonable ground of complaints on the part of Waterloo township.

All of which is respectfully submitted.

(Signed)

P. H. BRYCE,
E. E. KITCHEN.

XI.—REPORT ON THE POLLUTION OF THE SAUGEEN RIVER AND SILVER CREEK BY WALKERTON SEWAGE.

By J. J. CASSIDY.

To the Chairman and Members of the Provincial Board of Health:

MR. CHAIRMAN AND GENTLEMEN,—I was instructed while in Walkerton, to take samples of the water of the Saugeen river, and did so on the morning of September 3rd. The first sample was taken about 100 feet above the outlet of the sewer; the second, thirty-five feet below that point, and the third about 300 yards lower down. These samples were handed over to your analyst, Mr. Mackenzie, on September 4th, and the results are given below:

BACTERIOLOGICAL EXAMINATION.

Number of bacteria per cubic centimetre.

Taken 100 feet above outlet of sewer, No. 1.....	22,400
“ 35 feet below outlet of sewer, No. 3.....	4,940
“ 300 yards below outlet of sewer, No. 4.....	2,149

(Signed)

J. J. MACKENZIE.

I was informed by Mayor Standish and Dr. Dickenson, M. H. O., at the time of taking the samples, that the water of the Saugeen is not much used by the cattle for drinking purposes, as the current of the stream is swift, and there are many springs along the banks of the river, which are preferred by the cattle. The amount of sewage at present discharged by the Saugeen at Walkerton, is very small, the modern conveniences being used by not more than seventy-three people. Sewers however, will have to be built for the schools during the next three years, and for some dwellings which are not yet connected; but the number of townspeople taking advantage of the sewers in Walkerton will never be great as cellar drainage, owing to a gravelly soil, is extremely easy and the dry earth system prevails. Owing to the shape of the town also, the surface being hilly, the further introduction of sewers would be expensive and the town council do not wish to be precipitate in incurring further expenses. The current of the Saugeen is also swift, and the sewage would be carried away rapidly, so that it is not likely to be deposited on the banks of the river. As the analysis shows no pollution of the river by sewage, and for the other reasons given above, I think there need not be any objection to the discharge of the very small quantity of the town sewage of Walkerton into the Saugeen river. A very considerable amount of organic matter already finds its way into that river through the numerous creeks which discharge into it at Walkerton and elsewhere, along its banks. The addition of a small amount of town sewage, cannot make much difference. If at any future time, analyses should show a dangerous impurity in the water, the town sewage could be pumped on a filter bed before being discharged into the river.

All of which is respectfully submitted.

(Signed) J. J. CASSIDY, M. D.

Toronto, September 3rd, 1896.

Report re Silver Creek.

Having been further requested to report the condition of Silver creek, an affluent of the Saugeen river at Walkerton, I went to Walkerton on September 3rd, and in company with the mayor, Mr. Standish, and the M. H. O., Dr. Dickenson, inspected the sources of pollution complained of. These latter are a brewery situated on Elgin St., and three tanneries further down the stream, the last one inspected being close to the Saugeen river. The pollution attributed to the brewery, is caused by the discharge into the creek of the wash water used in cleaning barrels, etc. The pollution from the tanneries is not so much complained of, it being the opinion of my informants, that the refuse water from the tannery vats would be useful rather than hurtful on account of the lime it contains. The third source of nuisance not mentioned by anyone, appeared in the shape of a flock of ducks, which were sporting themselves in the creek at the time of my visit. Mr. Standish explained that the ducks were not commoners, but that they belonged to townspeople, whose lots extended to the banks of the creek, and were allowed to use the creek.

At some few places where the channel is winding, the odors arising from the creek are disagreeable, but I did not find anything in the shape of a nuisance, which could not be easily removed by a little judicious scavenging.

The creek is very swift, and if the channel is kept narrow and free from stones, etc., a considerable improvement would result. The absence of flocks of

geese and ducks would doubtless, also, be an advantage. I was informed by the mayor and Medical Health Officer, that in a year's time, an arrangement would probably be entered into between the council of Walkerton and the owners of the brewery and tanneries, for providing a sewer or sewers to carry off the waste waters from these establishments complained of, thereby entirely removing the nuisance.

The following is the report by Mr. J. J. Mackenzie, of your bacteriological laboratory, in a sample of the water of Silver creek, which was taken on the morning of my inspection:—

Bacteriological Examination.

Number of bacteria per cubic centimetre :

Silver creek, No. 2. 606,000

The sample was taken at a point of the creek below all the works referred to, and near its discharge into the Saugeen river.

(Signed) J. J. CASSIDY, M. D.,
Toronto.

XII.—REPORT OF SECRETARY *RE* SEWAGE PRECIPITATION WORKS, HAMILTON.

TORONTO, October 1st, 1896.

To the Council of the City of Hamilton :

GENTLEMEN,—In accordance with the terms of the following resolution of the Provincial Board of Health adopted on Sept. 15th, 1896,—

“The plans of the proposed precipitation works for Hamilton, were brought before the consideration of the Board, when on motion of Dr. Kitchen, seconded by Dr. Cassidy, the final decision of the matter was left to the Committee on Sewerage.” Carried.

A committee of the Provincial Board of Health whose names are hereto subscribed, visited Hamilton on Wednesday the 23rd of September, and having examined the maps and plans in connection with the location of the sewerage and proposed sewerage works of the city, proceeded in company with the city solicitor and city engineer, to examine the location of the filtering works now under construction, on the sewer near Coal Oil Inlet, as also the proposed site of the works at Ferguson avenue.

In the afternoon, the committee with the engineer examined the course and surroundings of the west end sewer.

The committee begs to report its opinion upon the several points connected with the disposal of Hamilton sewage as follows,—

1st. That the plans and details of the proposed filtering works, to be adopted for the east end sewers, are for a class of disposal works which have proved efficient in removing a very large percentage of solids from the sewage effluent; and the committee of the Board is of the opinion that if the management of the works when in operation be left to the care and supervision of the city engineer, who must be made responsible for the subordinate engineer in charge, there is every reason for the belief that an effluent can be poured into Hamilton bay of a purity compatible with the best interests of the public health.

The committee made several suggestions to the engineer in the matter of the precipitation and disposition of the sludge from the works, which it is hoped will prove, if adopted, an economy without a lessening of efficiency.

2nd. With regard to the Ferguson avenue works, the committee of the Board suggested as being worthy of careful investigation the possibility of arranging a smaller sewer for the dry weather flow at such a level as will enable the precipitation tanks to receive the sewage by gravity, and thus lessen the expense of plumbing works.

3rd. The committee of the Board after an examination of the territory along the west end sewer, is glad to be able to report the feasibility, owing both to the high level of the sewer and the existence of a level tract of good soil of disposing of a very large amount of sewage by the simple expedient of a sewage farm, at a comparatively nominal cost.

The committee would urge the council to give this matter its early and favorable consideration, since when completed, the city of Hamilton may congratulate itself as being the first of our large cities, to grapple with the problem of maintaining in its purity the heritage of healthful lake water which nature has bestowed upon them.

The committee has the honor to be,

Your very obedient servants.

PETER H. BRYCE.

I. D. MACDONALD.

XIII.—REPORT ON THE DUNNVILLE SEWERAGE AND DRAINAGE.

To the Chairman and Members of the Provincial Board of Health:—

GENTLEMEN,—Having received a complaint from the local board of health of the Village of Dunnville regarding a certain nuisance caused by the surface drainage which passes through the village and which is to some extent obstructed at the culvert made under the “Feeder” to the Welland canal, as set forth in the communication herewith submitted, your secretary visited the village on Nov. 21st, with the end of examining into the alleged nuisance and of investigating into its cause. From the accompanying map the Board will learn the position of the village and the relative position of the Grand river, the “Feeder” from it to the Welland canal and the course of the principal drains constructed within the limits of the village.

By an examintaon of the profile of the drains of the village prepared by surveyor Mr. George Ross, the Board will obtain a good idea of the topography of the village.

Briefly, its area may be stated to be a small portion of the level tract of heavy clay lands overlying the rocks of the Corniferous and Onondaga limestones, which extend along and to the south of the Grand river in its eastern course, and which continue almost without interruption to the edge of the Niagara escarpment. Thus as seen in the section map showing the course of the drain along Canal street, there is a fall of but three (3) feet in a distance of 2,500 feet in the direction parallel to the course of the Grand river.

This level character of the surface may be further understood, when it is learned that the council several years ago found it possible to turn water which had formerly found its way by the John street ditch in a circuit to the north and east of the town to the culvert under the “Feeder” after a course of some two

miles under the railway tracks by a ditch of ordinary depth, and then by way of John street, south to Alder street, thence eastward to the ditch along the "Feeder" by way of Tamarac street. It will thus be seen that water can be made to run in almost any direction with equal ease, if provided with an outfall: and it was this fact doubtless, which made the early engineers attempt to give an adequate outlet by way of Smith's creek culvert under the "Feeder" of the canal at the time of the construction of the "Feeder." The water level of the "Feeder" is ordinarily but 6 feet higher than that of the ditch which is carried under the "Feeder" by a siphon culvert 3 feet 6 inches high by some 6 feet wide. This water level of the "Feeder" is practically that of the Grand River above the dam, so that the fall to the level of the river below the dam from the back ditch is about 6 feet less than the height of the dam at the ordinary summer level. With the river in flood in spring, it is apparent that should the water below the dam rise to any great height, it will dam back the flow through the ditch which is often found inadequate to carry away the flood of water which pours down on the village from the township beyond. Attempts to give this latter flood water direction, have been made by the village constructing the John and Alder St., 18 inch drain partly open and partly covered. It is often found quite inadequate, the water flowing down the ditch until it rises above the general level of the ground and flooding lots and cellars, since the back ditch water cannot get away fast enough through the culvert, and the great ditch on Tamarac Street is filled level with the road.

Such then are the conditions which the Village of Dunnville has to deal with and which are due,—

1st. To the level nature of the surface and to the clay soil.

2nd. To the drainage of a large portion of the water from the rear townships of Moulton and Canborough being led to the culvert either through the village or around it, and is dammed back on the town.

3rd. To the inadequacy of the culvert, both because of its shallowness, its small area, and its level for allowing free outlet to the flood water.

It has been asserted that the nuisance which naturally results from a large amount of organic refuse being allowed to sediment from the semi-stagnant water in the ditch in flood-time, is due to the sewage: but the fact is that the ditches along the streets are mostly surface ditches, and when covered are, except on Canal street, two or three feet deep, and are not low enough to carry sewage, even were there house drains, which there are not. Indeed the matter of town sewage seems yet a long way in the future.

If then there is a nuisance caused in this manner, there seems but one way to readily remove it, and that is by giving to the drains of the western part of the town as direct an outlet to the river as possible, by the construction of another culvert under the "Feeder" to lead the water into the river below the dam at the nearest point to it which may be found practicable.

The advantages to be gained by this are:

1st. The dividing of the flood waters into two parts, each reaching its outlet by the shortest route.

2nd. By giving the western drainage a more rapid fall, thereby increasing the capacity of the ditches, while keeping the outlet of the drain into the river at a higher level than otherwise is possible and by so lessening the danger of a back-flow.

The claim that the village may at some future time utilize these culverts for carrying sewer pipes through towards their natural outlets may be dismissed on the ground that even if it were true, it is only natural that the Government, which by the construction of the "Feeder" has created an obstruction to the natural drainage and sewerage of the district, should bear any expense above that which would have been involved had no such obstruction existed.

Your secretary would therefore recommend that a copy of this report be forwarded to the Local Board and Council of Dunnville and to the Department of Railways and Canals at Ottawa, with the request that action be taken along the lines herein set forth for the abatement of the nuisance and the removal of the sanitary evils caused in the manner indicated.

All of which is respectfully submitted.

P. H. BRYCE.

XIV.—REPORT OF COMMITTEE ON SEWAGE ON OTTAWA SEWERAGE SCHEME.

To the Chairman and Members of the Provincial Board of Health :

GENTLEMEN,—Your committee appointed to examine into the outlets of the sewers in the proposed sewerage scheme for the City of Ottawa, submitted to the Board at its last meeting, begs here to report as follows :

The Board at that meeting approved of the general scheme in the following resolution :

Moved by Dr. Bryce, seconded by Dr. Cassidy,—

"That the Provincial Board of Health approve of the plans submitted for the sewerage of the City of Ottawa as set forth in the report and maps submitted ; that with regard to the dangers feared of the creation of a local nuisance, as pointed out by the medical health officer and others, on account of the location of the point of discharge of the sewer into the water works tailrace, the Board deems it necessary to make further investigation, but consents to the immediate submission of a by-law on the distinct understanding that should further extension of the sewer be deemed necessary, either at the present or at any other time by the Provincial Board of Health, the city council will be prepared to extend the sewer pipe into deeper water of the river as directed by the Provincial Board of Health." Carried.

It will thus be seen that your committee has laid upon it, not an engineering but a sanitary question, and that with a view to investigating this question it visited Ottawa on October 15th, and in company with the engineers who have had charge of the work and the city council proceeded to investigate the proposed sewer outlets as to their fitness from the sanitary standpoint.

As will be remembered, and as will be seen in the plans herewith submitted, the scheme divides the new drainage into two parts. District I. This includes the main sewer of the western side of the city, intended when its laterals shall have been completed, to drain an area of 1,100 acres, and to provide for a population at some future time of 60 persons to the acre.

At present the population of the area to be drained is about 10,000, and it is wholly unprovided with sewage except a section of Victoria ward.

A number of houses drain into a sewer now emptying into the tailrace almost at the point where the new sewer outfall is proposed to be constructed and receives the sewage of 400 houses or 2,000 persons.

The area in District I. to be drained is extensive and many of the houses are small and may be expected, as elsewhere, to connect with the sewers only gradually. For instance, it was found in Hamilton last week, that in a population of 11,000 in the area of the Eastern avenue sewer, constructed in 1888, there were in 1895 but 576 house connections with the sewers, or 2,880 persons out of a population of 11,000.

We may, therefore, expect that at the end of ten years a population certainly not greater than the present population of the district will be found sewerage into the western outfall.

Your committee therefore in considering the question of any unsanitary condition or nuisance arising from the disposal of the sewage of the western district from the outfall into the tailrace has considered it as to the effects to be produced by the sewage of 10,000 persons during the next ten years, remembering the terms under which the Board at its last meeting gave its approval to the scheme regarding the extension of the outfall.

From the plans herewith presented, it will be seen that the proposed outfall sewer of District I. is at a point just below the waste weir of the waterworks aqueduct, and receives all the waste water from it, and also all that which goes through the water-wheels.

The aqueduct leads from the Ottawa river and is of an area on bottom of 20 feet sloping upwards at a 2 to 1 incline of the banks, and according to the height of the river above may receive at least six feet more in height of water than there was at the time of the inspection by your committee. The height above datum, or the sill of the Rideau canal, was 44 7-10 feet at the waste weir at this time, being 7 inches lower than the river above, and the water flowing over the waste weir had a height of one foot, and the weir a width of 13 feet. Floats in the aqueduct gave a rate of flow therein of 88 feet per minute. This is the normal height of water on the waste weir which is allowed the city by legal agreement, so that the water flowing into the tailrace may be taken as a constant, except when in the spring floods a much larger quantity can be allowed to go through if required to maintain a head against the higher waters in the race below, and at a time when more water will pass through the pumps, owing to larger quantities being required for the city's needs. It will therefore be seen that with increased sewage from the area the dilution in the tailrace will remain practically constant, because of the greater quantity of water passing through the wheels required to pump the extra water returning from this district as sewage. The amount of water in the tailrace will be increased in proportion to the power required to pump more water to the other portions of the city. It necessarily follows that, whereas the sewage of district No. 1 may increase with the progress of the city, its dilution will be greater by water through the wheels; or if the sewage of district No. 1 increased in 10 years by 250,000 gallons daily, the flow in the aqueduct would be increased by the amount of water passing through the wheels necessary to pump in addition to this an extra 1,000,000 gallons of water to the rest of the city.

Having shown how the dilution of the sewage must continue to be as great or greater, even though the population of the area increase, we may now determine what the dilution will be for a population of 10,000.

The combined flow of water in July in the period of greatest heat and tendency to decomposition or the creation of a nuisance was estimated by the engineers in charge to be 157,045 gallons per minute, or (assuming the same rate of pumping at time of visit) 150,000 gallons going through the wheels, and 7,150, over the waste weir, at present head.

The town supply of water equals 100 gallons or more per head per day, to which is always added much ground water in the sewers.

For 10,000 population we thus have 1,000,000 gallons of sewage per day. The average sewage per capita per day in English cities is not more than 30 gallons. If we take this as the basis of sewage, whose composition is calculated, we would have 300,000 gallons of sewage daily from the district, or 208 gallons per minute. That is, the dilution would be one part sewage to 700 of water. A comparison of what this means may be made. The State law of Illinois regarding the Chicago canal requires :

1st. The finished canal will provide and maintain at all times a continuous flow of not less than 20,000 cubic feet per minute for each 100,000 of the population of the district.

If we add the actual sewage of district No. 1, or 100 gallons per head to the estimated flow from the aqueduct, we get a flow of 157,700 gallons per minute for a population of 10,000; or whereas the required flow in the Chicago canal is 1.5 of a cubic foot or $1\frac{1}{4}$ gallons per head per minute, that in the tailrace is 144 gallons per head minute or the dilution is 115 times as great.

The grade in the Chicago canal is in the rock section fixed at 1 foot in 20,000 feet, and 1 in 40,000 in the earth section.

In the 6,400 feet between the waste weir and Rideau canal lock the fall was on October 16th from 44 7-10 feet to $8\frac{1}{4}$ on the sill, or 36 feet roughly.

The following limits of the river at the Rideau canal are of interest :

Lowest water ever known, November 6th, 1895, 6 feet 8 inches.

Highest water ever known, April 24th, 1896, 25 feet 4 inches.

Lowest in 1883, 8 feet 6 inches.

Lowest in 1893, 7 feet 6 inches.

From these figures as may be supposed the flow at the point of proposed sewage discharge is very rapid, but is checked somewhat by the little dam at the lower bridge. From this there is a two feet fall and thence the waters move more slowly as they go to meet the waters from the slide and the tumultuous current of the main stream.

As the point has been raised naturally from the fact that sawdust lodges along the bank, at times in this part of the tailrace, when driven in by the wind, that sewage will similarly be carried to the shores in the eddy, it was of interest to determine the rate of flow at this point. With a party of 17 a large canoe was allowed to float in the main stream opposite the boathouse and just above the point of junction with the waters from the slide, when it was found to have travelled 160 feet in a minute, or over $2\frac{1}{2}$ feet per second, the normal flow in a small sewer required to prevent sedimentation. The calculated flow made by the engineers of the stream between lower bridge and end of Bronson's dock was 133 feet per minute.

As two places in the tailrace existed where the stones or rocky bottom were exposed, probably an eighth of an acre in all, it was of importance to determine to what extent such areas would be increased if the water should drop to a level

say, that of its lowest, 6 feet 8 inches, on November 6th, 1895. Each shore was carefully followed along in the boat, when the stones appeared free from sawdust deposit along the tailrace and to be covered to a depth of two or three feet of water with the exception of one or two places near the present exposures. As such areas receive refuse from the docks and lumber yards added to the usual vegetable materials in river waters, it may prove advisable to have the shallow spots deepened should shallow water occur in warm weather when decomposition is rapid. As similar uncovered areas exist within the docks, which are built up into hollow squares by timbers checked and laid upon one another and are therefore filled in high water, it may be found desirable to treat the sedimented deposits in these, if uncovered in hot weather, should such exist.

As much importance is attached, and very properly by the medical health officer, to the dangers which might arise from decomposing sewage if located in these two situations, your committee has endeavored to determine to what extent any sewage deposits might take place there on the shoals or in the docks, with the result that the calculation based on the solids, in normal sewage calculated from analyses made both by English and American chemists, would in the case of a population of 10,000 amount to practically one ton daily, of which at least one-third is mineral matter, and of the remainder two-fifths are in solution, that is, are dissolved in the water, and will either decompose in it or be carried onward with it. There will be then only the small residue of suspended organic matter which might in still water be deposited. Diffuse the few grains of it present in the total of 50 grains per gallon in the 700 gallons of water to each gallon of sewage and it will be practically so small an amount as not to appear of practical moment when compared with the considerable amounts of vegetable organic carried down by the river in flood. For these reasons the suggestion of preventing the inflow of water into the wharves does not seem necessary, while it would not be practicable without much expense.

That there will not be any still water in the docks in high water may be argued from the fall in the tailrace already referred to.

It will therefore be evident to the Board from these somewhat extended calculations which have been entered upon with the intent to show that while the Board, from the standpoint of the pollution of streams which may become sources of domestic supply, must always be opposed to the use of such as carriers of house sewage, yet in the present instance, inasmuch as the River Ottawa below the Chaudiere is by legal enactment the receptacle for organic matter in the shape of sawdust and mill refuse to the calculated extent of 300,000 cubic feet in a single season; and since the river has submerged banks of sawdust, in some places stated to be 50 feet deep, which through the decomposition continually going on must prevent the River Ottawa for many years to come from being considered a potable water for a very considerable distance below the city, it must be evident to everyone that the single sanitary question which the Board has to consider in the disposal of this sewage is, whether the addition of such amounts of solids from District I, as has been indicated, will so pollute the stream as to create any aerial nuisance either through its decomposition in the water or when possibly uncovered in the positions which have been indicated. The quantities seem too small to become of practical importance as sources of local nuisance, owing:

- 1st. To their small amount.
- 2nd. To the rapidity with which they are carried away.
- 3rd. To the great amount of water in the tailrace.

4th. To the rapid course of the river proper.

5th. To the enormous dilution since the total river discharge at the Chaudiere is estimated at 25,000 to 30,000 cubic feet per minute.

As was indicated to the Board on the plans submitted to it at its last meeting, there have been other plans made for the sewerage of the districts referred to in this plan, and your committee has given its attention likewise to these.

The plans of the city engineer, which were submitted to the people in 1893, and which were reported upon by Mr. E. H. Keating, C.E., city engineer, Toronto, provided for the sewerage of the district under four areas instead of two, at a cost approximating that of the present scheme, but varying from it in several particulars. Thus

1st. It notably lessens the discharge into the tailrace just below the waterworks.

2nd. For the limited application of the separate system of sewerage.

3rd. In the omission of plans for several limited areas.

4th. That the details of the scheme seemed in the view of the consulting engineer to require more elaboration before accurate estimates of cost could be arrived at, or the final course of the sewers in several instances be determined.

Inasmuch, however, as the plans provided for carrying a rather larger portion of the sewage lower down than the present scheme, one ending in the tailrace at same place as the present proposed outlet near the waterworks, and a second one at Concession street, just a short distance before the tailrace meets the river, and the other two outlets east of the Rideau, it is now claimed that this latter route would still be equally available for the greater portion of the sewage discharge.

A glance at the map will make it apparent that if the combined system of sewerage be adopted, as provided in both schemes for the eastern section, that the great distance from say, Centre street to the eastern outlet, would make any sewer large enough to carry the sewage and storm waters of some 1,300 acres with low grades at certain points a very expensive matter.

Your committee has had the following statement prepared by the engineer of the difference in cost between the present and an alternative system, whereby all sewage west of Concession street would flow into the tailrace via Preston street, and all east to the outlet in Rideau ward.

"With regard to the question as to the comparative cost of drainage of a large portion of the southern area of the city to the east and Rideau ward outfall, instead of to the western outfall in the tail-race channel, in the limited time at our disposal we are unable to make close estimates, though from the information on which we based our decision to recommend the western or Victoria ward outfall for this area, as well as other calculations made now, we feel satisfied that to attain the same results as to discharging capacity of sewers and area served, would cost over one hundred thousand dollars more than the plan proposed.

"We would like to direct your attention to the fact that the sewers we have proposed can be readily and economically flushed, if necessary, from the Rideau canal and the Rideau river.

"We would also like to draw your attention to the precipitous shore line and height of the city above the river, leaving but a narrow margin for deposit of

any kind. Though with the enormous dilution which the flow of the Ottawa river affords, as well as the fact that in the rapid current of the tail-race channel the sewage would be well diluted and disseminated before reaching the main channel of the river, there seems to be no likelihood of deposit."

While, however, your committee does not understand it to come within the province of the Board to discuss any plans other than those laid before it for consideration, yet inasmuch as local sentiment against the discharge of the major portion of the sewage into the tailrace has existed, and since it has been necessary to refer to the previous scheme voted upon in 1893, your committee trusts it may not be thought to be exceeding its duty to draw attention to the several suggestions regarding the adoption at various points of the separate system of sewerage made by Engineer Keating in his report.

It will be understood that in 1888 the old city limits embraced an area of only 914.4 acres east of the Rideau canal, and 914 acres west. Since then 1,742 $\frac{3}{4}$ acres have been annexed. As in other cities, the population of these suburban districts is still scattered, though in some districts rapidly filling up. Hence for a long time the sewers will largely serve principally as drains. In such instances it would seem especially necessary if limitation of the expense be a desideratum that the suggestions of Mr. Keating should be carefully gone into, since the fact of the city being surrounded practically with water courses, makes the feasibility of draining surface and sub-soil water into the canal and into the Rideau and Ottawa rivers most apparent.

For instance, to have instead of a sewer five feet in diameter one of 15 inches would be a matter worth considering.

Taking an actual case from our text books we have an instance of sewers in a town in a total of 48,491 feet running from a five feet diameter down to a 12-inch pipe, replaced by separate sewers of a length of 61,216 feet, the largest being 15 inches and the smallest six inches. The calculated cost for the first was \$150,000, while the actual cost of the other after construction was \$84,000, with only \$20,000 of additional cost required in order to provide sewerage for double the population.

So important indeed does it seem that the question of the applicability of the separate system to these outlying areas should be fully considered, that in the opinion of your committee it would be proper to recommend to the city council that they have this question carefully gone into by the engineers, since, should they find that the levels admit of the change of the out-falls more largely to the east without increasing cost, there could be no good reason why such a plan should not be adopted. Whether this would mean a single eastern outfall for the whole district east of Concession St., or two or three outfalls as suggested in Mr. Surtees' report your committee cannot state, since, in practice it is found that the smaller the sewer the greater the necessary grade.

With regard to the western outlet while, as has been fully illustrated already, there is not in the opinion of your committee any reason to fear a nuisance arising from the present proposed outlet, and hence your committee has no valid reason for advising either a change of outfall or an extension at present of the sewer, thereby increasing the cost; yet, it would recommend that this board acquiesces in any change such as either a present extension of the sewer in the tailrace until it meets the main stream, or in a change of course whereby the outfall of the sewer could be carried through Victoria ward flats into the Chaudiere should the city council so desire.

It is probable that by utilizing the present sewer in Victoria ward as a dry weather sewer and providing for other disposition of the storm water overflow, that the west end sewer outlet could be adjusted to the satisfaction of all parties.

Your committee would conclude its report by the following quotation from the report of Engineer Keating made in 1893.

"I need scarcely say that it is true economy to spend a liberal sum of money in preliminary surveys and investigations before commencing a project of this nature, and that I hope you will not make the fatal mistake, which is sometimes committed by municipalities, of curtailing the allowance of engineering expenses."

All of which is respectfully submitted.

(Signed)

PETER H. BRYCE.
H. E. VAUX.

TORONTO, October 21st, 1896.

XV.—REPORT ON POLLUTION OF PORT DOVER CREEK.

TORONTO, June 8th, 1896.

DR. P. H. BRYCE,

Secretary, Provincial Board of Health, Toronto:

DEAR DOCTOR,—Acting under your instructions, I visited Port Dover on May 26th, in order to investigate the sanitary condition of the stream which flows through that village.

I called upon Mr. R. M. Taylor, the secretary of the local board, but did not obtain any more information from him than is already contained in his letter to you. The map which he enclosed is quite accurate.

I then visited the stream itself. The stream is about seventy-five feet across and at the time of my visit there was a decided current; from what I know of other similar streams along the Lake Erie shore, I can easily understand, that frequently (depending upon the wind) there must be either no current at all, or a back flow from the lake.

I found that the privies of the fishing company were situated on the stream a short distance from the harbour, and are used by a number of men. They are situated about the point marked † on Mr. Taylor's map.

Some distance higher up, marked †† on diagram is situated a tannery which employs four hands. The tannery business is mainly tanning of green hides but a few imported hides are tanned. This information I had from one of the men as I did not see the manager. The vats empty into the stream.

Above the tannery is situated the woollen mill about ††† on the diagram.

I saw the manager and obtained the following information.

The mill employs eighty-five hands, all of whom use the privy complained of.

The privy is situated at the back of the mill and at the bottom is quite open. It is situated a little back of, and to one side of the point where the mill race issues from the mill, and at the time of my visit was not in direct communication with the water of the race. The manager told me however, that when the water

is high it washes back into the corner where the privy is situated, and carries away the material which has collected there. Of course all the time there is continual soakage from the privy into the race.

The woollen mills handle wool in all stages from the imported bales to the knitted goods. The wool used is mainly imported. The washings from this are poured into the stream. In addition the waste dye water, etc., is emptied into the race. The dyes used are mainly anilins. I could not see any evidence of extensive pollution from privies above the mill.

From my examination of these premises, and from the size of the stream, and also from what we know as to the causation of typhoid fever, I cannot think that the amount of faecal pollution is sufficient to be a menace to the public health. If the water below the woollen mills were used by dairies for washing pans, etc., the danger would be very great, but as a drinking water for cows as far as faecal matters alone is concerned, it cannot be as bad as many barn yard wells which receive all the drainage of manure heaps and stables. We have no reason to believe that the germs of typhoid fever or any other germs can get into the milk of cows drinking even filthy water, but of course there is no doubt as to the effect of bad water upon the health of the animal, and secondarily upon the quality of the milk.

At the same time, I must admit the method of disposal of the faecal matter at the woollen mills and fish buildings is not cleanly and could be improved with benefit to the health of the employees of these institutions.

As far as the health of the cattle is concerned, and secondarily the quality of the milk, I consider that the effluent water from the tannery and woollen mill is a more distinct menace.

Our experience in Ontario, as well as elsewhere, has shown that animals drinking and grazing along the banks of streams polluted by woollen mills and tanneries, are exposed to the possibilities of anthrax, due to the spores of the disease being brought in in imported wool and hides.

This danger of course is far greater when the polluted stream flows for miles through pasture lands than where only a few hundred yards can be used by animals. I hardly think judging from the small area of bank exposed to cattle, that the danger from anthrax is very great.

As to the influence of the dye waste and tanning waste upon the health of the animals, and consequently upon the milk I have no experience, but should think it would have an effect.

Another possible cause for complaint is the smell in connection with the tannery. This I think could be a good deal mitigated by properly looking after the fleshings, etc.

Finally there will likely in hot weather be a decidedly bad odor arising from the whole stream from the woollen mill to the harbour, and each one of the polluting factors must certainly contribute in producing it. I think it could be lessened by removing the privies and preventing the fleshings and other organic refuse from the tannery from getting into the stream, but I imagine it would still be present to a certain extent on account of the vegetable debris and the stagnation of the water. I would suggest therefore, in order to remedy these conditions the following:

- 1st. That a dry earth closet should be put in at the fishing building.

2nd. That the privy at the woollen mills be converted into a cess-pool with pipes draining out into the sand along the race, so that a filtration of the organic matter might take place.

3rd. That the tannery people be instructed to see that the freshings and similar organic refuse be carted away, and not be thrown into the river or allowed to accumulate near the buildings.

I may mention also, that I have been given to understand that there is a general lack of cleanliness in regard to the privies of the town, especially amongst those having summer cottages and tents, and I would suggest that a system of dry earth closets be put in force wherever possible.

I have the honor to be,
Your obedient servant,

(Signed) JOHN J. MACKENZIE.

XVI.—REPORT OF A CHEESE FACTORY PIGGERY NUISANCE AT FORMOSA, BRUCE COUNTY.

To the Members of the Provincial Board of Health :

MR. CHAIRMAN AND GENTLEMEN,—On the afternoon of September 2nd, at the village of Formosa, county of Bruce, I met by appointment Mr. McCoy, chairman of the local board of health of the township of Culross, and Mr. Johnson, also of that Board. The object of our meeting was to inspect a piggery, which was said to cause a nuisance. Complaint had been lodged with this Board by Mr. John Bowman, who lives close to the piggery, that his well had been spoiled and that the odors arising from the piggery were disagreeable and noxious. Complaint had also been lodged with the local board of health of Culross, but no satisfactory result had so far been reached.

I found the piggery was kept in connection with the Eskdale Creamery, by the proprietor, Mr. E. G. Kuntz. This young man conducts his creamery for six months of the year, from May to October, inclusive, and does a large business, as an instance of which I may mention that 7,000 pounds of butter were stored in his factory at the time of my visit. He claimed an output of 400 pounds a day. The creamery was clean and in good condition. About eighty-five feet in rear of the creamery was the pig stable, a small, frame building. Here I found twenty-two pigs. They were fed on the skim milk, which remains after the cream has been separated in the process of butter making, and also on a certain amount of low grade flour. Mr. Kuntz informed me that he never kept more than forty pigs. He sells 160 gallons of milk a day to a neighboring farmer, and uses the remainder in feeding his own pigs. About eight gallons a day were fed each pig. The milk is pumped from an underground wooden vat, and carried in vessels to the stable, three times a day. A small piece of land, about thirty by fifty feet, in rear of the stable, is used as a garden. This is very wet, swampy ground, and evidently receives the drainage of the surrounding land to the north-east, which is hilly. Some small fields on the ascending slope, in the rear of the garden, were the only places available on that side of the road for the feeding of the pigs, if Mr. Kuntz had wished to put them on the land instead of keeping them in his stable. These fields belonged to other parties. He informed me that the pigs

had been kept for some time on that piece of wet land, now used as a garden, but it was found to be altogether unsuitable for the purpose. At the time of my visit there was no manure lying about in the stable, and it was in a clean condition. Mr. Kuntz informed me that he removed the manure every week, and in the interim used sawdust freely. Sawdust is easily obtainable, as there is a saw mill in the village.

I then saw Mr. Bowman, the complainant, who lives on the next lot, and he reiterated his charges relative to the foul odors proceeding from the piggery, and the spoiling of his well water. He also complained that during the summer of 1895 he had had typhoid fever, and said, "that in the opinion of his attendant, Dr. Wilson, of Mildmay, the disease was caused by the foul well water and foul odor."

On considering the whole question, along with the members of the local board of Culross and Mr. Kuntz, I told them that the method of conducting the piggery was quite in opposition to that recommended by the Provincial Board of Health. I explained that the milk should be stored in a water-tight vat, where it could be sterilized by steam, from which it could be discharged by gravity or pumped through an iron pipe to a trough situated in a field at a suitable distance from dwellings. When pigs are fed in this way the manure on the field should be plowed under from time to time to prevent a nuisance.

Mr. Kuntz agreed to do all that was considered necessary, but said that as the season was drawing to a close, he promised to use sawdust freely in the stable, and to cart away the manure at least once a week. Next year he promises that he will not feed pigs at the stable near the creamery, but that he will send the milk to his father's farm in the vicinity near by.

On behalf of the Board I stated that if he found it advisable to continue the piggery in connection with the creamery, it would be necessary to have the pigs kept in a field and fed from a trough in the manner already suggested.

All of which is respectfully submitted.

(Sgd.) J. J. CASSIDY, M.D.

TORONTO, September 2nd, 1896.

XVII.—REPORT ON PROPOSED CEMETERY SITES FOR BRAMPTON.

To the Reeve and Council of the Village of Brumpton :

GENTLEMEN,—As instructed by resolution of the Provincial Board of Health, dated February 11th, 1897, I visited Brampton on the 19th inst, and in company with the reeve examined the location of the several sites which have been suggested for the proposed new cemetery for Brampton. I have to thank Mr. Crandell, the reeve, and Councillor Tredgold for their courtesy in supplying me with the information referred to in this report.

The first site examined was that of the present cemetery and the adjoining properties, viz., the Beynon property and the Wilson property: subsequently the location of the McLellan and Currie properties was visited.

1st. The Beynon Property.—Owing both to the limited area available, but more particularly to its proximity to the town and the present residences, I am of the opinion that the council should not consider this as a possible site. Present

difficulties of obtaining the approval of the residents within 200 yards of the site would prove insurmountable: and further, this proximity must, from the sanitary standpoint, be considered objectionable.

2nd. The Wilson Property.—Owing to its location as regards all existing residences, its proximity to the old cemetery, whereby one caretaker could equally well take charge of both, and to the level character of the land, the site would in my opinion be a desirable one, and quite available if the owners of the property within the 200 yards limit can be got to give their consent to its expropriation.

3rd. The Wilkinson Property.—Owing to its proximity to the old cemetery, and the level character of the land, and especially owing to its location across the railway, and the small likelihood of the town extending in that direction, and the availability for purchase of five, ten or twenty acres, as may be required either now or at any time in the future, this property is a most desirable one. The fact that it is across the railway and would require that an entrance be made to it can hardly be considered a serious objection, as a level crossing can be made and the time of funerals be arranged so that the inconvenience from passing trains could be avoided in the same manner as in passing over the railway to the present cemetery. The difference in cost of the land would probably more than pay for the cost of an entrance from Centre street.

The location of the McLellan and Currie farms was also visited, and apart from their distance from the village and the necessity created thereby for another caretaker, their location is equally desirable with that of the Wilkinson property. They have not the disadvantage—if it be one—of funerals having to cross the railroad except when coming through the town from the east.

As far as I have been able to gather the general character of the soil is practically the same in all the locations. Its character of a heavy clay loam demands that it be thoroughly under-drained as provided under the Act, and I would advise that field tiles be laid at an average depth of five feet at every fifty feet in width, with a proper fall to the creek. This will serve to prevent water accumulating in the soil, thus making the digging of the graves more difficult, while at the same time it will leave the soil more open and serve to allow the air to pass more freely into it.

While not able to say that there can be an absolute preference for any site I would advise the selection of the Wilkinson property for the following reasons: 1st. Because of the availability of any amount of land at a point of proximity, practically that of the Wilson property. 2nd. Because of its situation to the south of the village, thereby avoiding the necessity for drainage water going through that part of the town where the shops are, although any objection from the drainage passing into the creek would in my opinion be a sentimental rather than a sanitary one.

The only objection to the site, viz., of having to cross the railway, has been already referred to, but it is in any case common to the Wilson and Wilkinson property.

Trusting that this report may be of use to your honorable council in arriving at a proper decision in the matter,

I have the honor to be,
Your obedient servant,

P. H. BRYCE.
Secretary.

TORONTO, February 25th, 1897.

XVIII.—REPORT ON SUMMER "HEALTH RESORTS."

To the Chairman and Members of the Provincial Board of Health :

In keeping with the resolution adopted by the Board at its meeting in August, 1895, your Secretary with such time as has been at his disposal during the past summer, visited a number of the health resorts in the province with a view to obtaining some accurate idea of the sanitary condition of some of the chief hotels and boarding houses which entertain the public during the holiday season.

His chief attention was given to those resorts in the Muskoka and Georgian Bay district, but others as near Ottawa were also visited.

The general character of the resorts in all these districts consists of summer cottages and tents of private citizens, farm houses which take a few boarders, largely boarding houses which have grown up out of farm houses and hotels which are open during the summer season, and a few others which in addition to ordinary hotel accommodation have annexes open especially during the holiday season. Most of these resorts are situated in organized townships and here and there, as at Penetang and Parry Sound, are in towns or incorporated villages. They are under the nominal supervision of the local boards of health, but as most of these are in the rural districts, it can hardly be expected that any definite regulation of these resorts, except when an acute contagious disease occurs, will be carried out. Although situated in almost every instance on or near some beautiful sheet of water, they have in many cases to depend upon wells or springs for their water supply; but in some instances the supply is obtained as at Parry Sound, Penetang and Britannia on the Ottawa from public supplies. In other cases again, the water supply is pumped by wind-mill or water wheels from the neighboring lake or stream.

As regards the disposition of sewage, it may be stated that in the majority of cases the methods are primitive, consisting of privy-pits, while sinks, with badly constructed wooden drains serve to carry away the kitchen and chamber wastes into some neighboring low ground or into a cesspool, or even lake; which in some instances again is pumped up as a water supply by wind-mills. The plumbing in these cases, when such is attempted, is nearly always bad, having been constructed chiefly and often by tinsmiths or carpenters. The disposal of kitchen refuse is often local and creates a nuisance, while in one instance a slaughter house is maintained in the basement of a large hotel. In those cases where the sewage is discharged into the neighboring water, it has happened in several instances that the bathing ground is within a few hundred feet of the sewage outfall. In one such place the most serious outbreak of typhoid occurred during the past season.

The ice supplies for these hotels are usually taken from the neighboring water, and may or may not be of the best quality.

While these conditions are too common it must be stated that in many instances care as to the point of the water intake has been exercised, and the disposal of excreta by the dry-earth method is more or less thoroughly carried out. Fortunately, too, the short season and the long interval for the precipitation of local pollution in water supplies has prevented any serious results from arising, where such would certainly follow with longer occupation.

Where conditions have demanded immediate action, your Secretary instructed hotel proprietors to carry out certain improvements with, it is hoped, satisfactory results. The inspection being made in most cases at the time when the season was at its height, and owing to the limited time at his disposal, prevented any extended improvements being immediately possible; and hence this report is presented with its suggestions with the idea of having some organized inspection instituted during the coming year.

How much this is needed may be gathered from the facts that the City Health Officer of Toronto has traced at least sixteen cases of typhoid to one resort, nine other cases from seven different resorts, and seven other cases from outside towns. Most of these cases have been from places not having public water supplies.

With a view to ascertaining the views of the local health authorities in these districts, the following circular-letter was recently sent out to the local boards and to a few persons interested in the summer resort traffic with a view to obtaining suggestions which might be of use to the Board in dealing with the subject. Only a few replies have, however, been as yet received. It may be stated that Pamphlet No. 1, published by the Board, was sent out to the local boards of health in the Muskoka district, with the request to have them distributed.

TORONTO, October 30th, 1896.

DEAR SIR,—The matter of the sanitary condition of our "Summer Health Resorts" having been brought to the attention of the Provincial Board of Health in 1895, the Board directed that an investigation be made into the matter, and the Secretary of the Board has, during the summer of 1896, given the matter of his personal attention so far as his opportunities have permitted.

Speaking generally, he has found the many resorts in a fairly sanitary condition as regards their water supplies, but as regards the disposal of excreta and house-wastes it has been a common observation that the methods have been in nearly every case crude, resulting, in the instance of hotels and large boarding houses, in not only in local nuisances, but of in some instances danger to the inmates, and injury to the reputation of the particular locality for salubrity, and generally to that of the whole district. For instance, all Muskoka may be discredited by typhoid fever occurring in one hotel alone.

With a view to comprehensive and effective action, the Provincial Board is anxious to inaugurate in the larger health resort districts an inspection which may be systematized and made more effective than the isolated efforts, however meritorious of the many rural boards of health, within whose districts hotels, boarding houses and cottages may be situated, render possible.

I am aware of the existence in the Muskoka lakes region of an Association which has for many years had the interests of the district in its hands, and it has occurred to this Board that if in the interests of the railway and steamboat companies, of hotel and boarding house proprietors, and of individual cottagers, the Board were approached by representatives of the several interests in this and other districts, an arrangement might be made by which a trained sanitary officer appointed with authority from the Provincial Board, might give his constant attention to the districts, say from May to August, his expenses to be borne by a levy upon the several interests as mutually agreed upon.

In order that the work might be properly put in hand for the next year, the Provincial Board will require time to make its arrangements for inspection in

different districts, and will therefore be greatly obliged if you will at an early a date as possible communicate your views on this important matter to the Board.

Relying upon your active aid and co-operation in the work of making known and maintaining the growing reputation of our magnificent areas of health resorts in Ontario.

I am, yours very truly,

P. H. BRYCE,
Secretary.

The following extract from the active secretary of a local board in this district may be quoted as indicating the extent of local action :

"I do not think the general public are alive to the importance of the question of the disposal of house-wastes and of the water supply.

"The Board of Health only placing \$1.50 at my disposal for the purpose of inspection and report ; the inspection was not very extensive nor the report very long."

A gentleman from another health resort settlement says, "We expect to have more people next season, and would like to have the matter of disposing of night soil fixed so that it will be compulsory on all alike. There is a large and increasing number living in tents. We would like to know if we could bring them under the same regulation as householders, as to having closets constructed in the same manner and cleaned regularly. Can the Provincial Board of Health send any order to the Local Health Officer instructing him to enforce the plan suggested, if a majority of the inhabitants pass a resolution requesting it to be done?"

These illustrations added to what has been already stated, indicate not more the necessity for prompt, systematic and effective action being taken, than the extremely unsatisfactory means at present existing for instituting comprehensive measures and for carrying them into effect.

The extent of the interests involved may be gathered from the fact stated by the transportation companies, that some 10,000 of a summer population was added to the Muskoka lake region during the past season.

The problem of how to attain the desired results admits of several possible solutions. 1st. That of an inspector being appointed as an officer of the Provincial Board during the season at the expense of the Board. 2nd. That an Inspector be appointed by the Board to carry on the inspection at the expense of the proprietors of hotels and boarding houses, who may wish it, on the understanding that a list of inspected resorts be published by the Board. 3rd. That the hotels and transportation companies be arranged with to pay an Inspector to be appointed by the Board to inspect all resorts within a given area during the season with power from this Board to enforce the necessary improvements. 4th. That local boards of municipalities where health resorts are, be requested to report in detail the conditions of these several resorts, with a view to receiving suggestions for their improvement.

These suggestions are made in order that the Board may institute such action as the important interests of these districts demand, in order that the splendid national advantages of the lake districts of the Province as summer resorts may be maintained and become yet more widely known and taken advantage of.

All of which is respectfully submitted.

(Signed) P. H. BRYCE, M.D.,
Secretary.

SUPPLEMENTARY REPORT *re* SUMMER RESORTS.

To the Chairman and Members of the Provincial Board of Health :

GENTLEMEN,—Your special Committee appointed to deal with the question of summer resorts begs leave to report :

That in consequence, of the circular sent out by the Secretary prior to the last meeting, several persons and representatives of the transportation interests in the Muskoka Lakes Association have had correspondence with your Secretary and several conferences have been had with a view to beginning the work of practical sanitary supervision of the resorts on these lakes.

It was admitted by all that it is essential to the retention of the present, and the expansion of the traffic in these lakes, that the public resorts, at least, be inspected and maintained in a sanitary condition, and that the transportation companies with the hotels are especially interested in having the closest attention paid to these places, and that properly the major part of any expenditure should be placed upon them. The representatives of the companies recognized the reasonableness of this view, and promised to co-operate with the Muskoka Lakes Association with a view to guaranteeing a sufficient amount to pay such sanitary engineer as might be appointed to the work by this Board, to remain during the summer season constantly in the district, and inspect, draft plans and insist on their being carried out, with the result that the names of any hotel or boarding house may be certified to as being in a good condition as regards water supply, drainage, etc., and fit for the reception of guests.

No action has been taken in connection with any other districts, but your Committee believes that the work of inspection in the older counties may be in most cases dealt with as individual resorts through the local boards, if they are made aware of what is expected from them, and are advised in difficult cases by this Board.

Should, however, further extra inspection be required, as asked for by the settlers, local boards of health or by the cottagers and residents of any local resort, it is recommended by your Committee that similar inspectors be appointed by the Board and paid for in a similar manner.

P. H. BRYCE,
J. J. CASSIDY.

XIX.—REPORT ON THE SIMCOE COUNTY GAOL, BARRIE.

BY P. H. BRYCE, SECRETARY.

To the Chairman and Members of the Local Board of Health, Barrie :

GENTLEMEN,—At the request of Mr. McWatt, Chairman of the Local Board, I visited Barrie on the 17th of April, and examined into the sanitary condition of the County Gaol and beg to report thereon as follows :—

1. The gaol, although built in 1843, is still a very strong and substantial building and in these respects is well adapted for the purposes intended. I find, however, that while there were in all thirty-eight prisoners, (thirty-five males and three females), that there were but three men incarcerated for criminal offences, the rest being for minor offences, notably vagrancy.

Remembering the age of the building, it is not surprising that as it is turned so largely into a House of Refuge, the accommodation should be found inadequate during the winter months when the inmates are greatest. With the few female inmates, the air space is perhaps not too limited were there any ventilation: but this cannot be said of the cells and corridors where the men are confined.

This is best illustrated by estimating the cubic air space of the cells and corridors. On each of the two floors there are two corridors, each 8x30x9 feet with cells opening into these, the latter containing in all a space equal to twenty-four cells, 3x7½x9 feet. The total air space is therefore about 10,000 cubic feet; or for thirty-five inmates the available air space per prisoner is only 285 or less than 300 cubic feet. Remembering that the prisoners are confined in these spaces for twelve continuous hours at least, and in the locked cells for nine hours, with no ventilation whatever, except the air which is abstracted by the single wood stove in each corridor, and it will be evident that the foulness of the atmosphere must become very excessive and such as cannot fail to be injurious in a high degree to any confined therein for any length of time. This may be understood, when it is stated that the necessary average air space for living rooms, is estimated at 1,000 cubic feet per person, the air of which should be changed at least six times in one hour: while the regulation air space demanded for barrack rooms for the British soldier is 1,600 cubic feet per soldier, with adequate ventilation.

Under present conditions therefore, the situation demands the constant use of the dining room, and exercise room above, in which cots must be placed until other arrangements are made for the vagrant inmates.

To correct these serious evils due to the absence of ventilation in the corridors and cells, I would recommend that fresh air inlet tubes be brought from the attic room, down the wall at either end, also that a delivery tube be carried by way of the fanlight, into each cell, as indicated in the rough diagram herewith attached.

For exits for foul air, the chimney shafts can be most readily utilized, by carrying into them a galvanized pipe surrounding the stove pipe, throughout its whole length, as indicated in the rough diagram attached.

These stoves must be kept lighted in all weathers at night, when ventilation by the windows in the corridors is not available.

2. Ventilation openings under the ground floors opposite at intervals of twelve feet are most necessary.

3. The floors of the cells, and preferably the corridors should be made of cement, well laid on concrete, where other mineral foundation is not already present.

4. The water-closets in the corridors should have all the woodwork torn away, and the spaces cleansed, and an automatic flush tank should be supplied to the w. c. on the south ground floor.

Such are the principal immediate needs of the gaol proper

The quarters of the gaoler, peculiar in arrangement as they are in an old building, cannot be considered very satisfactory.

5. There is an improvement immediately demanded, and that is the old cellar in the centre be at once abandoned for use as such, and that its floor be cemented or filled with fresh screened gravel, and the walls kept whitewashed.

A brick larder or cellar on the level of the ground, and convenient to the kitchen, ought to be provided, should the cellar in the carpenter shop not prove available.

6. The area to the north of the gaoler's office, is filthy and must have the old decayed wood removed at once and be filled with fresh screened gravel or preferably floored with cement.

7. The wash-house floor should be at once laid in cement and inclined towards the gully-hole, which must be trapped.

8. For convenience and decency, the bath should be placed in the second floor, and a water pipe with hot and cold water carried to it.

9. The windows of this bath-room, looking on to the area, should be in part frosted.

10. The clothing stored in the upper room of the wash-house must be removed, and stored by hanging it on wires in the attic.

11. The attic is dark and should have skylights placed in the roof—preferably two south and two north.

I understand the town lock-up, comes under the jurisdiction of the County Council. The absence of any drainage or water supply, or ventilation, makes it a filthy place for all-night lodgers.

1. It should have a simple hopper closet, with trap or drain laid beneath the frost line. The closet should have a rim flush, with the water turned in from the town hall side, when the building is in use.

2. A water tap for drinking purposes can be attached to the same pipe.

3. The floors should preferably be of cement.

4. The method of ventilation suggested for the corridors of the gaol should be adopted.

With these several simple provisions carried into effect, your Board will have done much to remedy such sanitary defects, which if I read history aright, has attached to the building since it was first constructed. I find in the minutes of the Simcoe District Municipal Council, of date August 1843, the following presentment of the Grand Jury.

“They further beg leave to draw the attention of the magistrates to the ventilation of the lower cells in the gaol, which they consider must be injurious to the health of the prisoners, and which they think might be remedied by admitting thorough air, as in the cells above.”

Signed on behalf of the Grand Jury.

LEWIS B. ALGEO,
Chairman.

Trusting that this report may be of assistance to the Local Board in correcting the evils complained of recently by the Grand Jury.

I have the honor to be,
Your obedient servant,

PETER H. BRYCE.

PART III.

CITIES.

BRANTFORD.

REPORT OF MEDICAL HEALTH OFFICER.

The Chairman and Members of the Local Board of Health:

GENTLEMEN,—I beg to present the following Report for the year ending October 31st, 1896.

Mortuary Statistics:—The number of deaths during the year was 228, the population was 16,453 and the death rate per thousand was 13.85. Last year the deaths were 255 and the rate was 15.56. Of the 228 deaths, 63 were under the age of one year, 77 were under five years, 57 were over 60 and 11 were over 80 years of age.

There were 24 deaths from consumption, last year also 24; there were 14 deaths from cholera infantum, etc., last year 22; there were 10 deaths from diphtheria and croup, last year 15; and there were 5 deaths from typhoid fever.

Typhoid Fever:—From November 1st, 1895, to November 1st, 1896, there were five deaths from typhoid fever, of these one died in November and one in December, 1895, one in January, one in August and one in October, 1896. From November 1st, the beginning of the new sanitary year, until this date, December 15th, no fresh cases of fever have been reported, and no deaths from fever have occurred. As there are now no fever cases in the city, we may safely presume that the number of deaths during the actual year 1896 will be only three.

Two deaths of county patients occurred in the hospital from fever since November 1st, which are of course not included in this estimate. The whole number of fever cases reported during the sanitary year was 68. 54 were reported as typhoids; 5 as typho-malaria; 1 as malaria fever and five were simply reported as fever.

Every one of the 68 cases as fever reported was personally investigated by the sanitary inspector as soon as reported, and the sources of supply of water and milk were especially inquired into. As to milk supplies there is nothing in the returns to show an unduly large proportion of the cases amongst the customers of any one dairyman, but in as much as the water supply of many of the dairies is more or less exposed to contamination there are good grounds for the opinion that many of our comparatively few cases of fever this year may be due to an impure dairy water supply.

The Inspector's returns as to the water used by these 68 cases of fever, were necessarily based largely upon the statements of the patients or their friends, they appear to have been taken with conscientious care, and are probably substantially correct.

They show that 16 cases used city water only; 40 used well water only; 10 used both, and as to the remaining two the facts could not be ascertained.

It thus appears that of the 68 cases of fever, 50 used the water from private wells, either solely or partly.

The population using city water has now risen on a basis of one to five, to 10,500, those depending on private wells will therefore not exceed 6,000.

Hence amongst the population using only city water there were 16 cases in 10,500 or one in 656, and amongst the 6,000 using well water either in whole or in part, there were 50 or one in 120.

In some cases the first report as to the water supply proved incorrect, as for instance, a case on Park Avenue, the well on the premises had gone dry and the city water had been put in, the patient was reported as using only city water; on personal enquiry I ascertained that the family were doubtful of the city water and had absolutely used none whatever for drinking but obtained all their drinking water from a well on the adjoining premises.

Public Water Supply and Private Wells:—The number of water consumers in Brantford, according to the report of the secretary of the water commissioners, was, in 1895, 1,790, there were 312 additions during the year, making 2,112. Allowing five to one the population now using city water will be about 10,500.

The purity of the public water supply as a sanitary question is before all others. The public have a right to demand that the supply be made as pure as possible. It is also well that they should know what degree of purity or impurity it has, as compared with private supplies. Under the direction of this Board, I have had since April last, five examinations made by Mr. McKenzie, Bacteriologist of the Provincial Board of Health, of many samples of city water taken at the waterworks and at various taps in the city, and of river water at various points above and below the city, from the Holmedale Canal, and from the Dead Creek, also of samples from many private wells. The summarized results of these examinations are as follows :

City water, 22 samples examined, bacteria per cubic centimetre ranging from 40 to 295, average 113.

River and Holmedale Canal water, 17 samples, ranging from 920 to 11,187, average 3,732.

Dead Creek, several samples, estimated average, 4,478.

Private wells, 51 samples taken mostly from places where fever had existed or from wells ordered closed by this Board on account of contaminated surroundings, ranging from 190 to over 50,000, average 5,933.

Besides the bacteriological examination, Mr. McKenzie made a determination of the amount of chlorine (in parts per million) in the city and river waters and in the waters of eight of the private wells.

The amount of chlorine in the city water was constant at 8 to 9 parts, which is normal to the sandy soil through which it is filtered. The amount of chlorine in the private wells varied from 19 to 141, clearly indicating contamination of those wells by chamber slops or other liquid refuse.

The typhoid bacillus was not found in any of the samples, river, city or private wells.

The colon bacillus, proving sewage contamination, was never found in any city water sample ; it was found in three of the well samples examined.

I may here cite two instructive instances of contamination of private wells.

The Norris well on Terrace, said to be 100 feet deep, was used by a number of persons who had fever last year, one case was fatal. A sample of the water sent to Toronto showed 21,000 bacteria per c. c., and the colon bacillus was also found, proving sewage contamination.

The possibility of sewage contamination of such well was deemed by many persons incredible and the reliability of the examination questioned. This spring the sanitary inspector discovered that the night soil from several closets had been surreptitiously buried not far from this well. In coarse, gravelly soil the contamination of this well, if it were 500 feet deep would be scarcely avoidable.

The Hatcher well supplying three houses on Terrace Hill, very deep, was condemned by this Board on the bacteriological examinations and because several cases of fever had occurred there. The tenant's much preferred the water of this well to city water and the landlord resisted until the sanitary inspector discovered that the well on the next premises above, the natural drainage of which trended to the Hatcher well, had gone dry and the occupants were using it as a receptacle for household refuse.

Assuming that the larger part of the public water supply is derived by long distance filtration from the Grand River, the fear has been expressed that the effectiveness of that filtration might in time be impaired. In a report made when the present works were projected, I maintained that that was unlikely to occur, that the initial surface of the natural filter at the river would be periodically flushed and cleaned by the rising of the river during storms. Such an impairment of filtration might require the establishment of artificial filtration at great cost. It is satisfactory to know that the reported bacteriological examinations made this year of river and city waters tend to dispel any such apprehension. However foul the river may at times have been, as after heavy rains, however comparatively pure at other times, the city water has uniformly maintained the same condition of great purity.

In fact in October when the last samples were examined, the river water was very turbid and dirty and showed the highest number of bacteria of any sample we have ever had examined, viz., 8,680 per c.c., while a sample taken at the same hour from the waterworks well showed almost the lowest we have ever had, viz., 50 per c.c.

Private Wells in West Brantford :—Sanitary District No. 1, being that portion of Ward No. 1 lying west of the Grand River is in entirely different position from the rest of the city as to its water supply. The population is 1,380. There are about 200 private wells supplying 1,250 of the population, and only 26 city water services supplying 130.

This district lies low and has a direct relation to the Grand River quite different from all the other districts. From a careful study of these West Brantford wells for many years, and inquiries among residents, I find that most of the wells rise and fall with the river, are clear when the river is clear and turbid when the river is foul, showing that a large portion of their supply is a moderately filtered Grand River water. Although very many of the wells are exposed to contamination from a polluted adjacent soil, caused by household refuse, etc., the same as wells in other parts of the city, and the water is impure and unsafe, they have nevertheless this great advantage over wells in the rest of the city, that owing to this river supply most of them never run as low as other city wells. The amount of pollution is as great but the minimum of dilution never runs so dangerously low, the liability to fever in the dry and hot seasons is therefore not nearly so great. Hence, as might have been expected, the amount of fever is proportionately notably less in West Brantford than in the rest of the city, the proportion last year was about one-half and this year less than half.

The Future Prospect as to Fever:—Judging from all the experience and information we have we may come to the following conclusions :

1. With proper care and watchfulness as to our public water supply we may absolutely dismiss from our minds any fear of fever from that source at all events for very many years.

2. Whenever the time comes that private wells have ceased to be used by any considerable part of the population and when those who may be compelled to use them sterilize the water by boiling, especially in the summer and autumn, and when also the water supplies of dairies shall be secured against contamination, we may expect thereafter to hear very little of fever in Brantford. Until then we must not expect the amount of fever to be less than it has been during this year.

3. The occurrence of another season such as that of last year with very low ground water and high temperature we have good reason to expect will under existing conditions be the occasion of another severe fever epidemic.

Diphtheria, Scarlet Fever and Measles:—The number of cases of diphtheria reported was sixty-one, the number of deaths ten.

Nine cases of scarlet fever were reported, none fatal. Most of the sixty-one cases of diphtheria were connected with a dangerous outbreak commencing in September at 199 Murray street and spreading to many families. A child with diphtheria membrane actually filling the nostril was engaged in delivering milk to some families in the neighborhood. This case had not then been seen by any physician, and no report had been made of it. The rapid spread of the disease to children in that locality and to other children who had come in contact with them gave promise of a very wide spread and fatal epidemic. This has happily been controlled by isolation and disinfection, no cases having been reported since October 29th to this date, December, 15th.

Several dwellings were placarded, this, however, being done by the direction of the board only in those cases where notification has not been given within twenty-four hours, or where there has been neglect as to isolation, etc. The success of placarding only in these cases in securing immediate notification has been most satisfactory, and has materially helped in checking the outbreak.

There were twenty-two cases of measles, none were fatal ; sixteen of the cases were in the Institute for the Blind. The spread of the disease was prevented by careful isolation.

Milk Supply:—The last dairy inspection was made in August, when thirty-one inspections were made, all the details of which are duly recorded. To the inspector all the cattle seen seemed to be in good condition and well fed. The water supply in some dairies was to say the least exposed to much risk of contamination. The facilities for securing absolute cleanliness in the milking process were in many cases defective. When particles of stable manure are found settled at the bottom of the milk sold as is often the case, it is obvious that as they did not grow there they must have come from the animal milked or the man milking, and are absolute proof of a filthy milking process.

The last general milk testing was made on November 10th, when nineteen samples from as many different dairies were tested. I append a table showing the results of this testing. The quality of the samples taken from the wagons was exceptionally good, in fact the best I have known it for ten years, every sample was considerably above the standard in butter fat and was also of good specific gravity, the average of butter fat for all the samples was 4.53. I have the more satisfaction in recording this because the previous testing in summer was not so good,

some of the samples being below the standard of 3.50. The tests used in our laboratory are the Babcock tester for cream, the Lactometer for specific gravity and in cases of doubt a determination of the total solids by analysis.

Milk Tests November 10th, 1896.

No.	Centigrade.	Specific gravity at 15 c.	Butter fat.	Name.
3	9	32.3	4.40	Porteus.
18	9	29.8	7.80	Roeifson.
12	9	33.6	3.80	Birkett.
5	9	33.6	5.20	Bow Park.
10	10	33.4	5.10	Fell.
7	9	32.7	4.50	McEwan Bros.
6	9	30.8	4.80	Jones.
17	9	31.8	3.80	Lee.
4	10½	33	4.50	R. Berry & Co.
13	10	33.8	5	J. Britton.
8	11	34	4.40	W. Howard.
14	10	32.4	4	Passmore.
19	10½	32.1	4.10	Crawford.
16	11	33.1	4.20	Edmanson by James.
20	10½	33.9	5	Secord.
1	10½	32.1	3.80	Kerr.
11	10	32	4	Snider.
15	10½	33	4	R. Greenwo d.
9	10½	33.6	3.80	Nunick by Cluff.

Sanitary Inspection, etc.:—The books of the sanitary inspector show 604 general inspections of premises during the year, thirty-one inspections of dairies, thirty-six inspections of ice and eighteen baking inspections.

There were 287 complaints entered on the complaint book, 110 general nuisance notices were served. Fifty sinks connected to soak pits and mostly untrapped were cut off, and the soak pits emptied and abolished. Seventy sewer connections were enforced by direction of this board. Eighty-four wells in use were abolished by order of the board and a much larger number voluntarily discontinued. One hundred and twelve unused wells nearly all in ward number three which had gone dry on account of sewer construction were ordered filled by resolution of the board.

This work is nearly completed though much opposition was offered. Many persons wishing to keep the wells as convenient places of deposit for garbage, and when they had no sewer connection for house slops. A large number of these unused wells exist in other wards which we may hope to have filled up during the coming year.

Respectfully submitted,

EGERTON GRIFFIN,
Medical Health Officer.

CHATHAM.

REPORT OF MEDICAL HEALTH OFFICER.

CHATHAM, 8th December, 1896.

To the Chairman and Members of the Local Board of Health:

GENTLEMEN,—In accordance with the requirements of the Public Health Act, I herewith submit my annual report.

Contagious Diseases.:—There were twenty-one (21) cases of typhoid fever; no deaths, as compared with last year, when sixty-eight cases were reported; this is very favorable. The decrease is, I think, owing largely to the increased number of takers of the city water, and the further fact, there was more rain and less heat, favoring less decomposition in the rich alluvial deposits forming the ground on which we are located.

Diphtheria.:—We had twelve (12) distinct outbreaks of diphtheria and sixteen (16) cases, two of which ended fatally; in

	Cases.
February	3
March	8
April	2
June	1
October	1
November	1
	—
	16

In this also there is an improvement over last year, when we had seventy-four cases.

Diphtheria antitoxin is very generally used by the physicians in Chatham, though it was not used in the two cases of laryngeal diphtheria, which ended fatally.

I attribute the few cases and low death-rate in no small measure to the prompt use of this remedy, not only as a curative remedy, but as a prophylactic agent. In all cases coming under the city's control antitoxin was used to give immunity to those exposed. In investigating the causes of the several outbreaks, I was forced to the unpleasant conclusion that old, neglected and foul drains stood in the relation of cause in at least three of the outbreaks.

Four were brought to the city from other places; the remainder I could not trace.

Scarlet fever did not put in an appearance this year. Last year there were fifteen cases.

Whooping cough was quite prevalent during a part of the year. A majority of the cases were not attended by physicians, and those that were so attended were not reported to me. I made an effort to exclude children from school where the disease was known to exist in the family, but feel convinced that the effort was not always successful.

Whooping cough being one of the diseases included in rule 4, section 17, schedule A of the Public Health Act, should in every case be placarded.

The mortality from this disease in Chatham amongst very young children was probably greater than from all the other contagious diseases put together.

Total contagious diseases reported during the year, 37; total for last year, 157; total deaths from all causes, 124; death-rate 1.24 per cent., or 12.4 per thousand.

Water Works.:—In the beginning of the year there were 538 houses using the city water, and now there are 668, an increase of eighty during the year. The waterworks are no longer an experiment. The water is clear, wholesome and abundant, and every means should be adopted to keep it so. Sources of pollution above should be done away with, slaughter-houses and piggeries do exist but a short distance above the supply pipes.

The commissioners who are now conducting its affairs with such marked ability and discretion should be urged to take action to stop these undoubted and palpable sources of danger.

Water-closets are being established without any permit from this board, and with very little consideration as to how the sewage will reach the river—the same river from which we take our drinking water, which is bad enough. But in many cases it will remain in some old box-drain

and foul it, causing possibly emanations of foul smelling gas, lowering the vitality of those who inhale it, if not actually being the cause of outbreak of diphtheria and other diseases. One hundred and fourteen of such closets have been put in without any permits.

A large number of wells are in use which should be closed and city water put in. Springs of water are not found here, and the water in our wells is only water that soaks through the ground or drains into it. The consideration of this question leads to the consideration of what should be the most important to-day before the citizens of Chatham, viz. :

A System of Sewers:—About \$8,000 have been expended this year that may be of little if any use when a proper system is adopted. The time cannot be much longer delayed, for typhoid germs are being poured into sluggish drains with insufficient fall to multiply many fold before the river is reached and contaminate the water we drink.

Let us hope we will be spared the calamity of having our eyes opened by a severe epidemic.

A sum exceeding \$400 has already been expended in taking levels, etc., with a view of having a system to work by formulated. An additional sum of \$300 or \$400 would be sufficient to engage a sanitary engineer to complete a system, and the work could be done as required.

Diseased Meat:—Lump-jaw, or actinomycosis is, I am fully convinced, increasing in the neighborhood. Tuberculosis does exist here in cattle and probably in fowl. A fatal disease among swine does exist in Harwich, Howard, Dover and part of Chatham Township, which may be hog cholera or something else.

This board should, in my opinion, urge the Government to make a thorough inspection by an expert. Further than this, the optional by-law passed by the Ontario Legislature re establishment of abattoirs, etc., and providing for the inspection of meats, should at once by action of the city council be put into force.

All of which is respectfully submitted.

(Sgd.) W. R. HALL, M.D.,
Medical Health Officer.

HAMILTON,

REPORT OF MEDICAL HEALTH OFFICER.

HAMILTON, Ont., 5th December, 1896.

To the Chairman and Members of the Local Board of Health :

GENTLEMEN,—The sanitary condition of the city during the past fiscal year has been very satisfactory. Statistics show a considerably diminished death rate and fewer cases of diphtheria and scarlatina; typhoid fever gives a small increase over the previous year.

The total burials in Hamilton cemetery were 588; of this number eighty-five were non-residents of the city, and thirty-three were city still-born. Deducting the latter two from the total burials leaves a citizen mortality of 470 interred in that cemetery. One hundred and twenty citizens and five still-born were buried in the Roman Catholic cemetery at Rock bay, and sixty-five citizens of all creeds were taken to their family burial grounds in different parts of the country. The combined totals number 655 deaths vs. 702 in 1895, showing a reduction of forty-seven deaths. Taking the population at 50,000 (same as last year), the death-rate was 13.1 or 14.4 per 1,000: males, 336, females, 319.

Six citizens died while absent from the city; their remains were brought back for interment. Those deaths are not credited to our population in the provincial statistics. Two citizens died at sea, and I presume that their deaths are recorded only in the ship's log book and at the cemetery where buried. In the statistics given to your Board all deaths of citizens are included (as far as possible to do so), no matter where they die, and all transient visitors are excluded, including those coming into the city for hospital treatment, twenty-three transient residents died in the city, some in the hospitals, others somewhat suddenly while staying with their friends; two died suddenly on the street, and two children taken sick on the train coming from the United States died here. Our provincial statistics credit all those deaths to the city.

It is earnestly expected that the new Act of the Provincial Government relating to deaths will meet with the approbation of the medical profession, and that they will be particular in giving the correct cause of death. It appears to me that if the caretakers of cemeteries do their duty faithfully the Act cannot fail to be properly administered.

As far as records are available, sixty-one deaths occurred at the hospitals, ten at St. Joseph's, and the balance at the General Hospital, including contagious disease hospital; four deaths took place at the Aged Women's Home, and three children died at the Infants' Home on Caroline street; seventeen inmates of the House of Refuge and wards for incurables passed away during the year; six died at the General Hospital when they were removed thereto for treatment; nineteen cases are recorded as due to accidents, three of these being non-residents of the city.

Deaths of children under five years' of age number 190 vs. 229 in 1895; of the former number 143 were under one year vs. 170 the previous year.

With reference to contagious diseases, sixty-one cases of diphtheria and nine deaths were recorded at the health office vs. 138 cases and 26 deaths in 1895; also 47 cases of scarlet fever and no deaths vs. 76 cases and 9 deaths; typhoid fever shows 119 cases and 5 deaths vs. 94 cases and seven deaths, being an increase of 25 cases. The other contagious diseases are never fully reported; people who do not employ physicians in many of those cases claim ignorance of the law, and physicians are occasionally (unintentionally, of course) (?) forgetful, and fail to report.

Five hundred and nine cases of measles, 205 of whooping cough, 84 cases of chicken pox and 12 of mumps were reported; one death was reported from whooping cough, also one from measles. In the cemetery reports I find a few cases registered as whooping cough, so that the medical report and the cemetery report do not tally.

I would respectfully suggest to your Board the necessity of exercising more authority over the removal of contagious diseases to the hospital. According to the present system cases have been removed long before the Health Department receives any notice. This should be put a stop to by whatever means may seem most feasible to your Board.

A few complaints have been made about the reckless manner in which some persons mingle with the general public from houses where contagious diseases exist, particularly in cases of diphtheria and scarlet fever. The practice occasionally adopted of removing children from an affected house and sending them to school is fraught with danger unless a sufficient time is allowed to elapse before doing so. A case of scarlet fever was sent by train from Grimsby to our hospital; the circumstance was duly reported to the Provincial Board of Health. Cases are also reported as recovered from scarlet fever, and that the placard could be safely removed, although desquamation of the cuticle was still in progress with all those difficulties to contend with in preventing the spread of disease. Your Board may be congratulated upon having a, comparatively speaking, healthy city.

The following is a synopsis of the work done during the year ending 31st October, 1896:

Number of recorded inspections made	12,650
Privy vaults ordered to be cleaned	1,059
Cleaned by the contractors	1,353
Permits given for new ones	17
Abolished	102
Dry earth closets ordered to be cleaned	41
Cesspools " "	13
Cleaned by the contractors	34
Sewer connections ordered to be made	11
Found defective and ordered to repair	126
Foul drains ordered to be abolished	27
Stagnant water filled in ..	25
Dirty premises cleaned	15
Other nuisances abated	654
Old wells filled in	10
Infected houses fumigated by inspector	86
" placarded	78

Scavenger Work:—Number of loads delivered at the dump during the year:

Section 1	1,695
" 2	1,704
" 3	1,806
" 4	1,780
Total	6,985

Destroyed at Crematory:—

Dogs, 353 ; cats, 264 ; fowls, 202.....	819
Rabbits, 4 ; lamb, 1 ; calf, 1.....	6
Loads from city hospital.....	55
Mattresses from infected house.....	8
One load of carpets	1
Dogs, cats and fowl buried.....	342
Milk licenses issued good to 30th April, 1897	238
Samples collected and tested	1,216
Dairies inspected.....	430
Shops inspected	196
Cow byres inspected	401
Dairies reported in fair condition	1
Cow byres, dirty condition.....	6
Yards " "	7
Cows " "	8

All of which is respectfully submitted,

ISAAC RYALL,
Medical Health Officer, Hamilton.

KINGSTON.

REPORT OF MEDICAL HEALTH OFFICER.

KINGSTON, Ont., Dec. 31st, 1896.

To the Chairman and Members of the Local Board of Health :

GENTLEMEN,—I have the honor of submitting my report for the year 1896.

The following is a list of the contagious diseases reported :—

—	Typhoid.	Diphtheria.	Scarlet Fever.	Measles.	Mem. Croup.	Malarial.
January.....	4	8	4			
February		16			2	
March	1	7		1		
April		12	1		1	
May	2	5			3	1
June	1	5				
July	3	4			1	
August	9	1	1			
September	17	3				
October		12	1		1	
November	3	15	2		2	
December	1	18				
Total	41	106	9	1	10	1

Privies reported dirty by sanitary police	387
" " clean	2,507
Yards " dirty	107
" " clean	2,790
Cellars " dirty	14
" " damp	107
" " clean	2,544
Permits to empty privy vaults, during the year	620
Deaths from typhoid fever	5
" diphtheria.....	11

In the month of February there was an outbreak of diphtheria in three families living in Williamsville, a suburb of the city. The children of two of the families were immediately removed to the isolated wing of the Kingston General Hospital. In the other family's case isolation was secured in the home, and every possible precaution was taken to prevent the spread of the disease. The next outbreak of diphtheria was in the month of October, but it was not of such a virulent type as was the cases which occurred in the spring. Arrangements were made in the General Hospital last fall for the bacteriological examination of all cases of diphtheria, doubtful or determined, taken to the institution.

There is no doubt that the cause of diphtheria arises from the direct contact of certain susceptible constitutions with the specific virus.

Anti-toxine has been used by physicians attending in the hospitals with a certain degree of success. The treatment is approved of and considered satisfactory.

Typhoid fever, in the month of September, appeared in a certain section or block of houses. The cause was attributed to the use of river water from near the mouth of a large sewer. In a family of seven, six had the disease, but all recovered. In another instance, in which the sickness was caused by dirty premises, four out of a family of five had the fever; all recovered. The Board of Health caused, not only the premises in question, but the whole immediate neighborhood, to be thoroughly cleaned, and all matter suspected in the least as having caused the disease, removed.

Several wells, the water in which having been condemned upon examination, were filled up during the year.

Drains.—During the year 9,775 feet of tile sewer was constructed. It is earnestly hoped that the city council will see its way clear to keep on, year after year, enlarging and improving the drainage system until such time as the city will be properly drained; and also have built an intercepting sewer, through which all filth may be conveyed, and the river water thus prevented from being polluted with deposits.

(Signed) SAMUEL H. FEE, M.D.,
Medical Health Officer.

LONDON.

REPORT OF THE MEDICAL HEALTH OFFICER.

LONDON, Ont., 15th Nov., 1896.

The Chairman and Members of the Local Board of Health:

GENTLEMEN,—I have the honor to lay before you the final report for the year ending November 1st, being to a certain extent supplementary to reports already submitted. The health of the city has been exceptionally good, and never during the last decade has there been so few infectious diseases. There were 354 deaths in the year, and taking the population according to the assessment commissioner's returns at 34,855 give a death rate of a fraction over 10 in the thousand, as compared with 11.2 last year. This is the lowest death rate yet reached by the city, and I believe is the lowest of any city in America with 20,000 or more inhabitants. Ninety-five cases of infectious diseases occurred, including those sent to the two hospitals, compared with 99 last year, and 215 the year before. Classified, they were as follows: typhoid fever, 64 cases, with 4 deaths; diphtheria, 22 cases, with 6 deaths; scarlet fever, 9 cases, with 1 death. The typhoid fever was of a very mild type, only 1 out of every 16 dying. There were 8 violent deaths, including 3 by drowning. Cancer is given as the cause of 14 deaths, and consumption, which should be classed with the infectious diseases, caused the deaths of 35 persons. The population of the city increased during the year, 426.

During the year the city has commenced one of the most important sanitary enterprises it has ever undertaken—the construction of an enlarged system of sewerage. For the past ten years the question of the disposal of the city's sewage has been under consideration by the authorities; various attempts have been made to effect its solution, but the costliness of the remedies proposed have always interfered. With each passing year, however, the matter has become more urgent; not so much, perhaps, from a sanitary point of view as on account of the grave legal complications continually arising. Last year the chairman of the board of health, and his worship the mayor, determined on pressing this question to an issue; and were heartily sustained in their efforts by the local board and the city council. Experts were consulted; a general system of sewerage was outlined; a special Act of the Legislature was obtained; the sanction of the Provincial Board of Health secured; an educational campaign was vigorously conducted; the city newspapers gave a strong support to the measure; public meetings were held, and all needful information given; and the result was that by a large and most decided vote the ratepayers authorized the council to raise the money necessary to proceed with the work, which was estimated at over \$200,000.

The sewerage plans involve two main features—the collection and the disposal of the sewage. As to the collection, it was not intended, nor could it be, to provide a sewer at once for every street in the city. But the system does provide for intercepting sewers crossing the city, and laid at such a depth that hereafter on any street a sewer can be constructed, and the property on the street thoroughly drained. At present it is impossible to drain certain portions of the city, because any sewers constructed thereon could not be connected with the sewers now existing—these latter not being at a sufficient depth. When our new system is complete, two intercepting sewers will cross the city from east to west—one in the northern part and the other in the southern; while a third will run from south to north through No. 6 ward. With these intercepting sewers all others (both those now in existence, and those to be constructed in the future) can be connected; and in this way ample provision is made for draining all parts of the city, except a few low-lying sections on the river bank.

Wherever it may be possible to construct future sewers on the separate plan that course will be adopted—one pipe being laid deep for conveying sewage, and, if necessary, for cellar drainage; another in the same trench, but nearer the surface, for carrying storm water to the nearest water course. All experience goes to show that the separate system of sewers is, under ordinary circumstances, the best, especially if the sewage is to be disposed of by filtration. Of course it will not be possible to carry out the system entirely in London, because all the sewers hitherto constructed have been on the combined system, carrying both sewage and surface water. These old sewers have to be utilized, so that our system will operate both classes of sewers, the separate and the combined.

It is intended to have a carefully detailed survey of the whole city, laying down the lines on which all future sewers must run, the size of pipes, grades, etc. In this way nothing will be left to the chance opinions of whoever may be in authority in the years to come; but the entire system will be planned at once, covering every street, and all future construction will have to be in accordance therewith.

In storms, and when the river is at flood, the sewage may be allowed to flow directly into the stream; for there is no better method of sewage disposal than that of dilution, *i.e.* emptying it into a swift flowing current of sufficient volume to allow rapid chemical destruction of all organic matter. In summer, and in all dry seasons, our river is too shallow and stagnant for this purpose; and the discharge of sewage into it at such times is a menace to the public health. Under our proposed system, the dry weather sewage will be conveyed in a trunk sewer to the lands south of the river, at the western limit of the city and adjacent thereto. There it will be discharged on lands so prepared that in a few hours, before decomposition can take place and offensive odors arise, it will be filtered through the soil, purified by the chemical changes there taking place, and discharged into the river in a harmless condition.

The system which the city has now inaugurated, and the construction of which will at once commence, is no experiment. It has been carefully tested in other localities similarly situated to ours, both as to climate and soil. That it will be effectual is not a matter for debate; provided only that it is properly conducted. If it ever fails in any respect, it will be simply because ignorance or carelessness is allowed to control its construction or its operation.

With the completion of its system of sewage disposal London will be at the head of Canadian cities in all its sanitary arrangements. Two things alone will be needed as auxiliaries—a proper system of plumbing inspection, and some method of collecting and destroying garbage. The first of these, which was made a condition by the Provincial Board of Health of its approval of our sewage plans, is now under consideration by our local board; and as it can be operated without any expense to the city it will doubtless soon be adopted. The collection and disposal of garbage, however, will involve considerable cost; and though as a sanitary measure it is very advisable, the expense may for some time prevent anything being done.

T. V. HUTCHINSON,
Medical Health Officer.

OTTAWA.

REPORT OF THE MEDICAL HEALTH OFFICER.

OTTAWA, Ont., 15th December, 1896.

To the Chairman and Members of the Local Board of Health:

GENTLEMEN,—I beg to lay before you the annual report of the health department for the year ending 31st October, 1896.

In so doing, I am pleased to record the fact that the death rate for the past twelve months has been considerably less than that of previous years. The total mortality for the period comprised in this report, as shown in table I, here appended, has been from all causes, exclusive of

still-births, 896. This, with our present population, 52,000, gives us a death rate of 17.23 per thousand of the population; a good showing, and reliable evidence of the fact that the public health during the year has been fairly good. Out of this total number of deaths 367 were of children of five years of age and under, including the death roll of the foundlings in the House of Bethlehem for the same period. The chief causes of fatalities among these were diarrhoea and other diseases incidental to dentition, and the so-called preventable diseases, particularly diphtheria and scarlet fever. That these cases are still much more numerous than they should be is quite evident, and I fear will so continue until we have an isolation hospital equipped with steam disinfectors, which would overcome many of the difficulties we now encounter with sulphurous acid fumigations, and make the measure of prevention far more effective.

Among adults, consumption still leads the list with its quota of yearly victims, and no doubt will continue its havoc the world over until people are alive to the fact that it is communicable from one person to another living in the same apartments; also communicable from lower animals to man, chiefly through milk, and proper measures of prevention are adopted to stay the ravages of this fatal malady.

Typhoid fever is also a yearly visitor which contributes to swell our death roll, chiefly during the summer and fall months. This year it made its appearance somewhat earlier than usual and was also slightly more prevalent than in the previous season. That some of these cases are due to unhealthy conditions of the dwellings, or the surroundings, or both, seems evident, whilst the larger number by far may originate in contaminated water consumed, the majority of these originating in the suburbs of the city and surrounding country. The number of infectious cases that were received during the year in the isolation hospitals, shown in Table II, and comprising cases coming from the suburbs and surrounding country as well as city cases proper, is evidence that these hospitals were maintained throughout the year in fair working order, and the low rate of mortality among the cases there treated is fairly indicative of the efficiency of the work there done.

The number of infectious diseases reported at the health office during the past year appears in Table IV, here attached. In connection with this, I regretfully must say that physicians who faithfully enough report such diseases as diphtheria and scarlet fever, are still oblivious of their duty in so far as typhoid fever, measles, whooping cough and mumps, which the law compels them to report as well as the two first named diseases. The public, also, seemingly ignore the fact that the law holds them responsible for not declaring the existence of any such case in their household. It is owing to such neglectful conduct very often that diseases are spread from one family to another.

If physicians, as well as the public generally, would realize the vital importance of their compliance with public health regulations in this matter not only would such diseases be much less frequent, but our vital statistics under the enforcement of the law inaugurated in July last, which prevents the burial of anybody before the operation of a duly signed certificate of the cause of death, would require that degree of reliable accuracy which it is very desirable they should have.

The vital statistics of the House of Bethlehem as recorded in Table V show a decided improvement, largely due no doubt to better methods as regards the care of these foundlings and to the fact that the premises now occupied are much more commodious than those formerly used and in a much healthier locality. I deem it my duty to again revert to the fact that the want of a properly organized system of scavenging for the proper disposal of household refuse is a want sorely felt by a large portion of the community, and is, in the summer season especially, no doubt detrimental to the public health.

The ice supply of this city for household consumption is taken from the Ottawa River above the Chaudiere Falls, and partly from the Gatineau River, and the regulations of your Board in relation thereto have been willingly complied with by the ice vendors of this city.

There were during the year four prosecutions for neglect to report infectious diseases, with two convictions, one withdrawn and one dismissed.

For the details of the work done in the sanitary department, I beg to refer you to the full and lucid report of the sanitary inspector here appended.

In conclusion, I desire to express my entire satisfaction at the assistance given me by Mr. McNeil, the two assistant inspectors and also the police in carrying out the work devolving upon this department of the public service.

Respectfully submitted,

(Signed) A. ROBILLARD, M.D.

Medical Health Officer.

TABLE I.

Total mortality from all causes for the year 1896.

Disease.	November.	December.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	Total.
Apoplexy		1			3	1	1					2	8
Abscess					3		1						4
Anaemia					1		1	1		1			4
Accidental—Cars						1	2				2		5
Burns			1			1							2
Falls			1			1	2		2	2	1		9
Shooting						1							1
Drowning							2	2	5	1			10
Appendicitis		1					1						2
Alcoholism											1		1
Bronchitis	5		1	2	1	2		5	2	5	1	2	26
Consumption	12	4	11	6	2	9	11	14	6	4	7	6	92
Congestion of lungs					1		1			2	2	2	8
Cerebritis	1	2	1			1	2	2	2	3	3	3	20
Cystitis										1			1
Cholera nostras										1			1
Cancer		1		1			1	3	4	4	3	2	19
Biliary calculi					1								1
Diphtheria	6	3	4	1	1	1	1		2	4	1	3	27
Including croup	1	2	3						1		1	1	9
Dropsy		1			4			1	2		2	3	13
Diarrhoea	5	2	3		3		5	27	50	22	14	6	137
Other diseases incidental to dentition	2	3	3	1	3	2	5	12	12	14	10	4	71
Emphysema					1								1
Epilepsy			1								1		2
Embolism								1					1
Gastro Enteritis	1		1	1	2	2	5	1			1	1	14
General debility—Infantile	4	4	4	3	3	4	7	3	4	3	6	5	50
Senile	2	1	1	2		4	3	2	2	3	1	3	24
Erysipelas				1		2							3
Hepatitis	3	1		1				1				1	7
Hydrocephalus					1								1
Heart failure	1				1	1	1	1	1	1	2	1	10
Heart disease	4	5	2	6	4	1	1	5	1	1	2	4	36
Hemorrhage	1		1		1	3			1	2	1		10
Intestinal obstruction	2			1					1				4
Laryngitis			2										2
Meningitis			1		1		1	1	1	1			6
Measles								1					1
Morbus coxis	1												1
Myellitis									1				1
Nephritis	2		1	1	1		3	1			2	1	12
Pneumonia	1	3	5	1	4	4	4	8	6	2	6	5	49
Paralysis	2	1	1	7		4	3	2	4	2	3	3	32
Peritonitis			1	2	1	1	2	1		2		1	1
Pertussis	1	1						1			1	2	6
Premature birth	3	1	1	2	2		2	1	1		1	1	15
Puerperal fever	1			1	1	3							6
Rheumatism									1		2	1	4
Scarlatina	1	1	1		2		1					1	8
Old age	3	3	2	4	5		1	4	10	3	1	4	44
Pleurisy						3		1		1			5
Syphilis								2					2
Scrofula									1	1			2
Septicæmia	2		1	3	2	1		1	4	1	1	1	17
Typhoid fever	2	4	1		1	1			1	5	3	3	21
Tumour	1		2		1	1					3	2	10
Uræmia									2	1			3
Tetanus	1						1			1		1	4
Totals	7	45	57	48	56	59	70	105	130	95	85	75	896
Exclusive of still births	3	3	1	3	3	2		1	5	3	2	3	23

TABLE II.

Showing the number of patients treated in the Hospitals for contagious diseases and deaths resulting therefrom during the year 1896.

Diseases.	Protestant annex.			Roman Catholic annex.		
	No. admitted.	Discharged.	Deaths.	No. admitted.	Discharged.	Deaths.
Diphtheria	95	85	10	92	80	12
Scarlatina	62	62	.....	15	14	1
Measles .....	.....	.....	.....	.....	.....	.....
Total	157	147	10	107	94	13

TABLE III.

Showing the death rate per thousand from zymotic diseases as compared with the total death-rate from all causes in the City of Ottawa during the past eight years as well as present year 1896.

Year.	Population, estimated.	Zymotic diseases.								Total Zymotic.		Total all causes.		
		Smallpox.	Measles.	Croup.	Scarlatina.	Diphtheria.	Typhoid fever.	Puerperal fever.	Diarrhoeal diseases.	Others.	No. of deaths.	Rate per thousand.	No. of deaths.	Rate per thousand.
1888.....	23,000	.....	2	2	2	62	46	.....	166	9	283	7.07	915	22.97
1889.....	40,000	.....	13	19	5	59	18	2	188	17	321	7.46	983	22.86
1890.....	43,000	.....	4	13	4	39	19	1	160	25	265	6.02	960	21.81
1891.....	44,000	.....	6	14	24	30	9	3	203	21	310	6.88	908	20.17
1892.....	45,000	.....	16	7	4	15	13	.....	13	68	1.46	983	21.13	
1893.....	46,500	.....	5	6	5	17	16	3	158	29	239	4.97	892	18.58
1894.....	48,000	.....	5	41	23	78	17	1	195	33	393	7.86	1,083	21.66
1895.....	50,000	.....	9	15	33	80	15	2	249	.....	403	7.75	1,083	20.82
1896.....	52,000	.....	1	9	8	27	21	6	208	10	290	5.57	896	17.23

TABLE IV.

Showing number of cases of infectious diseases reported at the health office during the year 1896.

Scarlatina	122
Diphtheria (including croup)	153
Measles	4
Typhoid fever	295
Total	574

TABLE V.

Record of the House of Bethlehem for the past year, 1896.

How disposed of.	No.
Admitted during the year	214
Placed outside or returned to parents	94
Died during the year	95
Remaining.....	25

REPORT OF THE SANITARY INSPECTOR FOR THE YEAR 1896.

OTTAWA, 19th December, 1896.

To the Chairman and Members of the Local Board of Health :

GENTLEMEN,—I beg to submit for your consideration the Annual Report of the Sanitary Department for the year ending 31st October, 1896.

In so doing, I am pleased to be able to again report favorably of the manner in which the assistant inspector and others employed by your board have performed their duties.

The records of the work of the past year as shown in the tables annexed will compare favorably with previous years.

The treatment of refuse at the several dumping grounds, judging by the entire absence of complaint, has been successful. The removal of dead animals from public places has not been so satisfactory, however, owing to negligence on the part of the contractor appointed for that work.

In addition to the work enumerated in the subjoined tables there were :

165 houses disinfected.

73 houses placarded for infectious diseases.

58 cards removed from infected houses.

28 tests were applied to detect defects in plumbing.

12 summonses were issued for contraventions of the "Public Health Act" of which 11 convictions were secured.

I am Gentlemen, your obedient servant,

(Signed) GEO. McNEIL,
Sanitary Inspector.

TABLE I.

Classification of nuisances under notice of the Department during the year.

Description of nuisances.	By whom reported.					Total.
	Sanitary staff.	Tenants.	Neighbors.	Owners.	Others.	
Accumulation of manure.....	15	.....	11	3	4	33
“ of stagnant water.....	21	13	18	.....	2	54
Cellars flooded and otherwise polluted.....	62	74	4	.....	3	143
Drains choked and otherwise defective.....	9	51	7	.....	.....	67
“ box.....	4	2	.....	.....	.....	6
“ none.....	20	6	.....	.....	.....	26
Dwellings unfit for habitation.....	10	3	.....	.....	.....	13
“ dirty, etc.....	8	.....	5	.....	1	14
“ sewerage escaping into.....	18	18	3	.....	1	40
“ illuminating gas escaping into.....	18	12	1	2	3	36
Foul yards and premises.....	524	.....	206	24	63	817
Illuminating gas escaping on streets.....	5	.....	.....	.....	8	13
Privy vaults of defective construction.....	50	14	27	.....	.....	91
“ none.....	1	5	.....	.....	.....	6
Pigs kept too near dwellings.....	.....	.....	2	.....	.....	2
Sinks untrapped.....	.....	2	.....	.....	.....	2
“ none.....	5	2	.....	.....	.....	7
Soil pipes unventilated.....	3	.....	.....	.....	.....	3
“ defective.....	6	.....	.....	.....	.....	6
Waste-pipes defective.....	12	3	1	.....	.....	16
Water closets of defective construction.....	3	4	2	.....	.....	9
“ unventilated.....	4	2	.....	.....	.....	6
Water pipes burst.....	5	.....	.....	.....	.....	5
Want of water for domestic purposes.....	2	.....	.....	.....	.....	2
Miscellaneous.....	18	.....	.....	.....	35	53
Totals.....	823	211	287	29	120	1,470

TABLE II.

Statutory notices issued during the year (in connection with Table I).

Time.	Notices.				Total.
	To proprietors.	To tenants and others.	Written.	Verbal.	
1895.					
November.....	18	50	20	48	68
December.....	21	16	10	27	37
1896.					
January.....	26	12	11	27	38
February.....	10	31	7	34	41
March.....	15	21	10	26	36
April.....	47	124	42	129	171
May.....	30	103	28	105	133
June.....	72	88	67	93	160
July.....	47	90	40	97	137
August.....	63	97	60	100	160
September.....	35	52	33	54	87
October.....	24	29	20	33	53
Totals.....	408	713	348	773	1,121

TABLE III.

Location of nuisances and number on each street.

Streets.	No. of nuisances.	Streets.	No. of nuisances.	Streets.	No. of nuisances.
Albert	24	Flora	2	O'Connor	19
Anglesea Sq.	3	Gloucester	25	Papineau	4
Archibald	2	George	10	Portland Av	3
Anderson	5	Gilmour	12	Peter	2
Ann	10	Head	1	Primrose	5
Augusta	10	Henderson	1	Percy	5
Alice	5	Hill	2	Pinard	2
Arthur	15	Isabella	5	Pine	5
Bay	9	Jane	1	Pine, N.E.	2
Baird	5	John	1	Preston	19
Bell	14	James	3	Porlar	4
Besserer	14	Kent	9	Perkins	1
Bridge	25	Keefer	1	Queen	4
Bolton	5	King	23	Queen West	2
Boteler	13	Lisgar	8	Rochester	4
Bank	43	Le Breton	13	Rideau	23
Broad	14	Lewis	8	Russell Ave	1
Britannia	2	Lett	3	Rose	3
Balsam	5	Lochiel	3	Redpath	7
Cambridge	6	Lloyd	5	St. Andrew's	14
Cathcart	8	Lyon	12	St. Joseph	4
Cartier	2	Lorne Av	3	St. Patrick	31
Crawford	2	McGee	3	Sparks	44
Oedar	4	McLaren	11	Stewart	6
Church	10	McKenzie	3	Sophia	3
Concession	14	McDonald	3	Sussex	24
Cobourg	10	McDougali	5	Somerset	5
Canal	1	McLeod	11	Slater	18
Cumberland	25	McKay	8	Sherwood	11
Clarence	38	McTaggart	10	Spruce	6
Cooper	13	Maria	29	Stanley Ave	7
Creighton	5	Murray	30	Theodore	6
Charlotte	1	Maple	4	Thornton	4
Chapel	17	Monk	2	Turner	13
College Av	3	Marlborough Av	4	Vittoria	5
Charles	2	Middle	4	Victoria Ave	8
Catharine	3	Mutchmor	6	Water	18
Cliff	3	Metcalf	10	Waller	8
Daly ave	18	Mosgrove	2	Waverly	3
Dalhousie	21	Margaret	3	Wellington	30
Division	38	Martineau	3	Wilbrod	12
Dolly Varden	1	Markets } W. Ward	3	Willow	4
Dufferin	2		5	William	6
Duke	15		5	York	17
Elgin	12	Nelson	8	1st Avenue	5
Eccles	7	Nepean	21	2nd Avenue	8
Emily	6	Nicholas	13	3rd Avenue	14
Elm	5	Neville	2	4th Avenue	3
Ellen	5	Notre Dame	2	Other places	53
Friel	3	Ottawa	15		
Frank	1	Osgoode	2		
Florence	6	Oregon	3	Total	1,470

STRATFORD.

REPORT OF THE MEDICAL HEALTH OFFICER.

To the Chairman and Members of the Local Board of Health :

In submitting my report on the sanitary condition of Stratford for the past year, I have pleasure in congratulating the citizens on the healthy state of the city during that time.

In Hamlet Ward, 15 deaths occurred ; in Avon, 10 ; Falstaff, 6 ; Shakespeare, 16 ; Romeo, 28 ; making in all 75 deaths during the year. This, in a population of 10,500, will give a loss of about 7.14 per thousand. There were 15 deaths less than the previous year.

Of those who died, we find that 2 died at the age of 90, 4 at the age of 80, 11 at the age of 70, 13 at the age of 60, 7 at the age of 60, 7 at the age of 50, 4 at the age of 40, 3 at the age of 30, 5 at the age of 20, 5 from 15 to 20, 4 from 10 to 15, 2 from 5 to 10, 6 from 1 to 5, and 8 under 1 year.

Outbreaks of typhoid have been reported in a number of places, but we have fortunately been comparatively free from it. In all 33 cases have been reported, with 3 deaths.

Our immunity from this disease is no doubt due to the actions of your board in having all closets removed 30 feet distant from the wells, to the fact that our subsoil is stiff clay, thereby rendering percolation almost impossible, and to the close observance of our milk supply, as it frequently happens that the disease has been communicated by milk, the cans having been washed with water containing the bacteria. Inspections have been made of all the dairies supplying milk to the city, and the water supplied to the cows for drinking, as well as that used for washing the cans, carefully tested. The ventilation of the stables, feed and general surroundings, carefully noted, not a single case of disease has been traced to the milk supply.

In all cases where fever was reported, a careful inspection of the premises was made with a view of ascertaining the cause. The water used was examined, and the sanitary conditions of all the surroundings carefully observed. These precautions carried out doubtless tended to limit a number of cases.

There were 40 cases of scarlet fever reported during the year, with one death therefrom. These occurred during the early part of the year, no cases having been reported since July 3rd. It was a very mild type as is shown by there being only one death. Diphtheria has almost become a dead letter with us, only two cases reported during the year and three the previous one. These two cases occurred in one family, were of a comparatively mild type, isolation, etc., being strictly enforced. Other cases occurred ; notwithstanding our immunity from such cases, we should place ourselves in a position to give assistance to cases of this nature by making hospital provision for same. In my last report I strongly urged the necessity of having such a place provided, and again direct the attention of the board as well as the citizens generally to the necessity in case of urgent need.

Our milk supply has been highly satisfactory, the average percentage of butter fat being above the standard. The tests for same were made periodically during the year. The milkmen are becoming alive to the necessity of having good food supplied to their herd, keeping healthy animals, securing wholesome water for them, and enjoining healthy surroundings, all tending to produce good wholesome milk.

For the amount and details of sanitary and other work done during the year, I will refer you to the report of the sanitary inspections as here appended. I have great pleasure in expressing my appreciation and approval of the work done. Any complaints made were promptly investigated, and, with few exceptions, satisfactorily disposed of.

There are other matters to which I have referred in former reports, and to which I again ask your attention. Sewerage matters have been receiving considerable attention during the year, the initial steps towards the introduction of a system of sewerage being overcome ; the trunk sewer completed from the outlet to Nile street ; connections therewith attended to at the earliest convenience will allay complaints occasionally made.

The best method of disposing of the sewerage matter from the city is a question which has given the Sewerage Committee, as well as your board, no little consideration and trouble. Mr. Vanbuskirk being of the opinion that there is not sufficient land at the outlet of our main sewer which can be utilized for a sewer farm, it becomes imperative to adopt some method of disposal.

The new sewerage purification system, as was recently presented to your committee by Mr. John McDougall, of Montreal, on account of its claimed efficiency and economy, the cost being within our reach, is worthy of your consideration. By this process, the sewerage is treated with a chemical precipitant and deodorant, called *Ferozone*, the solids being precipitated in settling tanks. The ferozoned sewage is afterwards filtered through specially prepared filter beds of *polarite*. This substance possesses the properties of oxydizing the poisonous organic matters, and converting them into harmless inorganic and saline compounds.

The principal advantages claimed by this system over all others, are: "1st. Purity of effluent. 2nd. Simplicity and low cost of working. 3rd. Small area required for works. 4th. Small quantity of sludge. 5th. No public nuisance caused by works. 6th. Small cost of construction."

The efficiency of this modern method of sewerage purification seems to have been demonstrated by its satisfactory workings in a number of places in England and elsewhere.

In a letter recently received from Dr. P. H. Bryce, Secretary of the Provincial Board of Health, with reference to our sewerage disposal, he expresses the hope that the Council will be able to announce by the end of the year what it has decided upon.

All of which is respectfully submitted.

J. A. ROBERTSON,
Medical Health Officer.

ST. CATHARINES.

REPORT OF THE CHAIRMAN BOARD OF HEALTH.

To the Mayor and Council of the City of St. Catharines:

GENTLEMEN,—In accordance with the requirements of the Public Health Act, I herewith submit my annual report of the sanitary condition of the city for the year ending the 15th of November, 1896.

The low rate of mortality, and the almost entire disappearance of malarial, and other zymotic diseases are the best indications of the very satisfactory sanitary condition that has prevailed in St. Catharines during the past year.

This favorable showing may, I think, be attributed in a great measure to our plentiful supply of pure water, the extension of the drainage system, the great precautions taken to ensure the purity of the milk supply furnished to our citizens from the licensed dairies, and the care exercised in isolating cases of contagious disease.

At the request of Mr. McFarlane, the government analyst, the Central School authorities are testing the efficacy of the Sphagnum, or Peat Moss, as a deodorant and disinfectant, in the latrines attached to that institution. This peat moss is obtained in the County of Welland, and is now in use in the Town of Welland, for the purposes above mentioned. Mr. McFarlane states that after being saturated with ammoniacal liquids, the peat moss becomes an excellent and cheap fertilizer, and that it could be used to great advantage by the farmers and fruit growers in the adjoining townships.

More than the usual efforts have been made during the past year to thoroughly flush and disinfect the sewers; as sewer gas, even when it does not engender disease, by lowering the vitality of those exposed to its influence, renders them more prone to contract, and less able to resist the depressing effect of specific morbid affections.

It would be advisable to obtain a sufficient length of hose to enable the sanitary inspector to carry out efficiently the instructions of the Board with respect to flushing the sewers during the coming year. It is also highly essential in the interests of those residing or doing business on King and Queen streets, that an automatic flushing tank should be placed near the junction of James and King streets.

The nature of the construction of a portion of this sewer, and its nearly flat grade, render it necessary to flush and disinfect it more frequently than is required in the case of the other city sewers. I am credibly informed that the cost would not be excessive, and the waste water from the city fountain would serve to operate the tank without involving any additional outlay.

The sanitary inspector, whose report is hereto annexed, has always been prompt to attend to any complaints brought to his attention, and has personally superintended the flushing of the sewers, and the disinfection of the houses whose inmates had recovered from contagious diseases of a dangerous nature.

As will be seen by consulting the accompanying report of the secretary of the board, the total number of deaths from all causes occurring in the city during the year ending on the 15th day of November, 1896, was 137. Estimating the population of the city at 10,000 the death rate would be 13.70 per 1,000. By deducting the number who died from old age, premature birth, accidents, drowning and killing, twenty in all, I find that the rate of mortality, based on the estimate of the number who died from disease of some kind, is only 11.70 per 1,000 which is remarkably low, and speaks well for the sanitary condition of the garden city of Canada.

Respectfully submitted,

E. GOODMAN, M.D.,

Chairman, Board of Health.

REPORT OF THE SECRETARY.

To the Chairman and Local Board of Health of the City of St. Catharines:

GENTLEMEN,—Herewith I have the honor to submit the annual statement of the number of deaths in the City of St. Catharines, from November 15th, 1895, to November 15th, 1896, and the causes thereof, also statement of the number of contagious diseases for the same period as per medical returns :

DEATHS.

Disease.	No.	Disease.	No.
Cerebritis	2	Pneumonia	13
Consumption	14	Heart Disease.	10
Indigestion	1	Palsy.....	1
Senile Gangrene.....	1	Old age	5
Cancer	7	Diarrhoea	2
Puerperal fever	1	Catalepsy	1
Dropsy	3	Killed.....	1
Croup.....	2	Meningitis	2
Apoplexy	6	Brain disease.	3
Convulsions	3	Suffocation	1
Still born	6	Anæmia	2
Hæmorrhage	1	Paralysis.....	2
Bronchitis	3	Hernia strangulated.....	1
Morbus Brightic	1	Drowned.....	1
Inflammation	2	Abscess	1
Paresis	1	Premature birth	2
Diphtheria	2	Typhoid fever	4
Disease of abdominal glands	1	Tumor	1
Cholera Infantum	6	Jaundice	1
Inanition	2	Accidents	4
Osteo Sarcoma	1	Kidney complaint.....	1
Rheumatism	1	Pulmonary disease	1
Marasmus.....	2	Cerebral compression	1
Appendicitis.....	1	Tuberculosis	1
Obstruction of bowels	1		
Peritonitis	4	Total	137

CONTAGIOUS DISEASES.

Reported.	No.	Deaths.	No.
Scarlet fever.....	8	Typhoid fever	4
Typhoid fever	7	Diphtheria	2
Diphtheria	19		
Measles	89		
Total	123	Total	6

I have the honor to be,

Your obedient servant,

J. ROLLISON,

Secretary.

REPORT OF THE SANITARY INSPECTOR.

To the Chairman and Local Board of Health of the City of St. Catharines:

GENTLEMEN,—I have the honor herewith to submit my annual report (as sanitary inspector to your honorable Board), for the year ending November 15th, 1896, and say:

That I have placarded 16 houses during the year, in compliance with medical returns of contagious diseases.

I have visited the cow-byres, slaughter houses, hide houses, livery and hotel stables, canning and other factories within the city when necessary, and have generally found them in a cleanly condition.

The city sewers have been frequently flushed during the season, and have been disinfected when necessary.

The streets, lanes and yards have received strict attention, and I am pleased to say, that they have been kept clean generally.

The city scavengers have removed about 1,000 barrels of night soil during the year.

I have tested the milk sold by the vendors thereof and the average registration has been 90 and 92.

I have made 1,100 house to house inspections during the year, and am pleased to say that I was kindly received by all persons in connection therewith, who showed a willingness to comply with all orders and instructions in regard to sanitation.

I have made weekly visits to our "Sanitary Hospital" during the year, and have pleasure in saying, that the said institution is in good order and condition, and ready for use should necessity require it at any time.

Respectfully submitted,

ARTHUR BOULDEN,

Sanitary Inspector.

TORONTO.

REPORT OF MEDICAL HEALTH OFFICER.

TORONTO, December 1st, 1896.

To the Chairman and Members of the Local Board of Health :

GENTLEMEN,—I have the honor to transmit herewith the Annual Report for the Departmental year 1896, which is in a measure a resume of the monthly reports already submitted, and a summary of the year's work. The methods of quarantine and isolation of patients, and disinfection of premises, as outlined in former reports, have still been continued and adhered to, and the returns from the various branches of work in the Department for the year which is concluded shows a close parallelism with previous records.

When considering the dissemination of contagious disease, one must necessarily take into account the influence of schools. The class-room is the focal point of meeting for children of similar ages, constituting thereby a ready means for the spread of infectious disease.

The Health Department has to thank the school authorities for their hearty co-operation and assistance in the reporting of suspected cases of contagious disease existing among the pupils. Notices are supplied to the Health Department, and an inspector is at once sent to investigate the ground of complaint. If a medical man is in attendance he is communicated with. If the family are too poor to command the services of a medical attendant, one is supplied from the Health Department. In the event of such investigation confirming the original suspicion, prompt measures are adopted to prevent the entrance of members of the family into the school or schools. In cases of threatening epidemics, where a number of pupils are attending one class or division of the school, that class or division is closed, and if such closure is not sufficient to materially curtail the extension of the disease among the pupils, the entire school is closed.

In threatened epidemics, in circumscribed localities, it has been found of service to communicate with the school teachers of the district, and obtain from them a list of their absentees, in order that the homes may be inspected, and the actual cause of absence from school determined. By such methods disease in its incipency becomes detected. Cases which might not otherwise be reported become known at once to the Department, and the salutary results of such work is immediately manifested. It is necessary to impress upon the public the fact that the school class-room contaminates through direct contagion of pupil with pupil, and it must not be considered evidence of unsanitariness in the school to find a number of the pupils affected with contagious disease. Children of the same age, sitting at the same desk, interchanging the same working material, playing together in the same room or yard, and communicating in the methods peculiar to child life, constitute in themselves potent agencies in the spread of disease.

During the last six months we have had operating in the Province of Ontario the recent amendments relative to the registration of deaths, and the issuing of burial permits. So far as my observations have gone in reference to the matter, I consider the modifications in connection with the Burial Act most important and beneficial. It brings within the knowledge of the Health Officer every death from contagious disease, or suspected contagious disease, occurring within the municipality. It renders next to impossible neglect in reporting severe cases, for should the medical attendant from various reasons not wish to report such case, the possibility of a fatal termination would place him in a very serious and awkward position. It renders possible the control of the funeral by the Health Officer, insuring the strictest privacy at such obsequies, besides preventing the transmission of infected bodies from one town to another.

Plumbing.—The drains having been put in a satisfactory and sanitary condition, and properly tested and filled in, the next thing to be done is to locate the plumbing fixtures. In this no more pipe is to be used than is absolutely necessary, so that it may be thoroughly flushed. The soil pipe is placed in position, running as straight as possible up to and three feet above the roof, and away from all openings of the house or building, leaving fittings to receive wastes from various fixtures, care being taken that no right-angle junction is used on other than vertical pipes. Should it be necessary to insert into a horizontal pipe any waste, a full Y, with the requisite bend, should be used.

Nearly all fixtures are connected to wastes by means of lead. Sometimes traps made of brass, iron or porcelain are used. Each plumbing fixture should have its own separate trap, which should be placed as near to the fixture as possible. Care should be taken in selecting a trap that it is smooth inside, of the proper shape, and with a sufficient seal. The shape should be such as will offer the most resistance to siphonage, and, at the same time, not retard the flow

through it. The size of the trap should be governed by the amount of water which is to pass through it. From the crown of every trap a vent pipe should be taken, one size smaller than the size of the waste pipe. The object of this pipe is two-fold : first, to act as a break siphon ; secondly, as a vent pipe. The By-law permits this pipe to be of wrought iron, with steam fittings, which, owing to the fact of its being cheaper, is in many cases used instead of cast-iron, brass or lead, but is not so good, owing to its liability to rust or scale, and which even galvanizing will not entirely prevent. This pipe should commence and continue to rise after it has once left the trap, and it should be so constructed that it cannot act as an overflow for the fixture to which it is attached, in the event of the waste becoming choked. These pipes are usually carried up and connected to the soil pipe above the highest fixture, but in some cases they are carried through the roof independently. Pipes which pass through the roof should not be less than four inches in diameter at the roof line.

There should be a cleaning screw placed in this pipe near the trap, and the pipe should be occasionally examined to see that it is clear. Waste pipes should be straight, and as short as possible, care being taken, where bends or offsets are made, that the bore is not decreased, and that the back of the bend is not reduced in thickness.

All fixtures should be of non-absorbing material, made of a pattern that is easily cleaned, and always left open, so that, in airing a room containing a closet, all parts of the fixtures will be ventilated.

In the case of water-closets, they should be so constructed that all parts will be thoroughly washed each time the tank is discharged ; operate as noiselessly as possible ; have proper water seal, and retain sufficient water to prevent solid matter adhering to the closet. Each water-closet, slop sink or urinal should have a three-inch, or larger, local vent, properly connected to fixture and terminated in a heated flue.

After the plumbing and drainage systems are completed the smoke test should be applied to see that all connections are tight which have been made since the water test was applied to the rough work of the system.

Food Inspection :—The inspection of food was transferred to the Medical Health Department on the 1st day of April, 1896. From that date until the 31st day of October, 1896, the following numbers of animals have passed through the market :

Cattle	73,099
Hogs	125,124
Sheep and lambs.....	70,757
Calves	5,159
Total	274,139

Number of inspections of street shops, butcher shops, and other places where meat is sold	4,655
Shops and warehouses where fish is sold.....	501
Shops and warehouses where bread is sold.....	1,565

The following is a list of confiscated food stuffs made during the above period :

5,103 lbs. of beef.
183 lbs. of mutton.
330 lbs. of veal.
8,894 lbs. of fish.
4½ gallons of oysters.
13 turkeys.
15 pair duck.
23 pair chicken.
48 baskets of peaches.
14 barrels of apples.
105 baskets of cucumbers.
6 boxes of cucumbers.
108 boxes of strawberries.
3 cases of eggs.
72 rolls of butter.

Shop Inspection :—Since October, 1895, there has been appointed in the municipality of the City of Toronto a female Shop Inspector, under the Act for the protection of persons employed in places of business other than factories, and since that date a thorough inspection has been made of all such places within the City of Toronto and coming within the Act.

Four thousand seven hundred and thirty inspections in all have been made, of which 267 were places coming within the Act. Complaints were registered against 39 of such places. With the exception of the large stores in the city many of the places of business are where the persons employed are members of the same family, or where a number of employees are not more than five in number and therefore do not come within the meaning of the Act.

(Signed) CHARLES SHEARD,
Medical Health Officer.

REPORT OF MEDICAL SUPERINTENDENT OF ISOLATION HOSPITAL.

ISOLATION HOSPITAL. November 23rd, 1896.

Charles Sheard, Esq., M.D., Medical Health Officer, Toronto :

SIR,—I have the honor to submit the following report regarding the Isolation Hospital for the year ending November 22nd, 1896.

1. There were admitted to the Hospital during the year 451 patients of all kinds, 388 cases of diphtheria, 55 cases of scarlet fever, and 8 cases of measles. On November 23rd, 1895, when the hospital year commenced, 48 patients were in the Hospital, and to the end of the month 16 were added to the number. In December 46 were admitted; in January, 1896, 54 were admitted; in February 26, in March 23, in April 29, in May 23, in June 30, in July 25, in August 11, in September 15, in October 44, and to November 22nd inclusive, the end of the year, 51 were admitted.

Of the 451 patients 363 were discharged from the Hospital in the regular manner, 52 died, and 48 remained in the Hospital when the year closed.

2. *Diphtheria.* The admissions for diphtheria during the year numbered 388. All of them were subjected to a bacteriological examination. Whenever a patient was brought to the Hospital a swab or smear was at once taken and forwarded to the efficiently equipped laboratory of the City Medical Health Department, where Professor Shuttleworth, who has charge of the city's bacteriological work, made an exhaustive examination of each case. In this way it was discovered that 36 of our cases of supposed diphtheria were not cases of that disease, and that instead of 388 cases we had 352 cases during the year of true diphtheria in the Hospital.

Of these 352 cases 175 were tonsillar, 50 tonsillar-pharyngeal, 3 pharyngeal, 81 naso-pharyngeal, 32 laryngeal, and 11 laryngo-naso-pharyngeal. The laryngo-naso-pharyngeal proved a very dangerous and fatal form of the disease, death occurring in 7 of the 11 cases. Since the introduction, a few years since, of a more systematic and energetic employment of steaming, and of calomel sublimation, in the treatment of laryngeal diphtheria, a remarkable diminution has taken place in the mortality of what a few years ago was the most fatal of all the forms of this terrible disease. We had 32 cases of purely laryngeal diphtheria during the year, and of these only 9 died, and of the 9 all but one were moribund when admitted. During the year there were in all 14 moribund cases, 8 of them were laryngeal, 5 naso-pharyngeal and 1 laryngo-naso-pharyngeal.

There were 52 deaths. If we include the moribund cases, the death rate was $14\frac{3}{4}$ per cent., and if we exclude them it was $11\frac{1}{4}$ per cent.

3. *Scarlet Fever.* There were admitted during the year 55 cases of scarlet fever. Thirty-nine cases were S. Simplex, 14 of S. Anginosa and 2 of S. Maligna. There were no deaths.

4. *Measles.* There were 8 cases of measles and no deaths.

Your obedient servant,

G. TWEEDIE, M.D.

REPORT ON BACTERIOLOGICAL LABORATORY.

BACTERIAL DIAGNOSIS OF DIPHTHERIA.

SIR,—I beg to submit the following statement of the bacteriological work carried on in connection with the diagnosis of diphtheria, as applied to the admission and discharge of patients in the Isolation Hospital, and also to cases referred to the Department by city physicians.

In your last annual report you published the results of this branch of bacteriological work from the time of its inception, on February 1st, 1895, until June 30th following. A detailed account of the operations continued from the last named date to July 1st, 1896, was presented at the annual meeting of the Executive Health Officers of Ontario in September last. As it is impossible to report immediately on cases of which the clinical results may not be known for two months, or perhaps longer, from the time of the first bacteriological examination. I therefore submit the paper referred to as part of this report, and suggest that the practice thus necessitated be a precedent for the future.

REPORT.

A year ago I had the pleasure of presenting the results of six months' bacteriological work in connection with diphtheria, as carried on in the laboratory of the Toronto Board of Health. I now desire to briefly continue the record, so as to cover the intervening period from July 1st, 1895, to June 30th, 1896, and also to offer such deductions as seem justified by prolonged experience.

There were examined during this period the original exudates from 559 patients, of which 377 were from the Isolation Hospital and 182 from city physicians. The clinical records of the former cases are complete, but no systematic attempt was made to keep track of the latter, and the details submitted only refer to bacteriological particulars.

Collection of Exudates. The plan first pursued in this laboratory of supplying swabs in corked tubes, and making the cultures in the laboratory, has proved, in all respects, entirely satisfactory. Published records of our institutions show that when both swabs and media are supplied a considerable portion of the cultures are unsatisfactory, and have to be so reported. This arises partly from the fact that the culture media is dried up, or from the removal of the wool has become contaminated, and, partly, that physicians are not, perhaps, all as careful, or capable, as the laboratory worker, who is constantly engaged in such manipulations. There is abundant evidence to show that it is best for the bacteriologist to sow the seed as well as to look after the crop. Under such conditions, and with good swabs, there need not be any failures whatever.

Too much emphasis cannot be placed on the latter point. The physicians should endeavour to wipe off a small piece of membrane, or at least to use sufficient force to detach some of the outside layer, which is commonly richest in bacilli. The presence of epithelial cells, as shown by the microscope, is pleasing evidence that some force has probably been used, and that the exudate submitted is not mere superficial mucus.

Diagnosis by the Exudate. I am more than ever convinced of the advisability of examining the exudate before making a culture. Reliable conclusions may often be arrived at in a few minutes. The gain of twenty-four hours in making a sure diagnosis is worth much to the physician; more to the patient, and often still more in the matter of isolation.

It was previously reported that a certain diagnosis had in this way been made in at least one-third of the cases, and a fairly correct idea in about three-quarters of the exudates examined up to July, 1895. Experience has increased the proportion in which the characteristic bacilli have been thus detected, as I find that positive evidence was given in 54 per cent. of the exudates sent in since that time, while 20 per cent. were marked suspicious, and 26 per cent. negative. Failure to find the bacilli does not prove their absence, and it is only when they possess definite and well marked characters that the indications are of value. To a fairly experienced eye this appears the case in about half the exudates submitted.

Staining. I am not aware of any stain which, for all-round purposes, is better than Loeffler's methylene blue. Having tried many others, including the dahlia and methyl green mixture of Roux, one returns with pleasure and satisfaction to the old and well tried formula.

Fifty-six experiments were made with most of the eligible anilines, with various additions, but though many combinations answered well—as the bacillus is easily stained—none gave better septation and polarity than that of Loeffler, while for ease in working, uniformity in effect, and keeping qualities, the latter proved superior.

Relation between the Size of the Bacillus and its Virulence. Observations as to the size of bacilli found in cultures have been continued during the year, and the results confirm the statement previously made—that this character affords little on which to base a prognosis. The records show that the disease was mild or severe in about an equal proportion of the cases in which the cultures showed large bacilli. Mild cases predominated when the bacilli were of medium size, and this was also the case when the micro-organisms were small. In the instances in which the bacilli were very irregular the severe cases were nearly double those which were classed as mild.

On looking up the details of the last 45 fatal cases, there were twenty instances in which the bacilli were large, six medium, ten small, and nine very irregular as to size. Large bacilli here apparently indicate the most serious consequences, but I doubt if this and similar data warrant such conclusion, more especially when taken with previous experience, by which an opposite result was reached by Park and Beebe, and also by me. It appears reasonable that long, well-developed bacilli would be likely to grow most vigorously, produce the greatest mechanical obstruction, and the maximum quantity of toxin; but against this there must be taken into account the influence of culture media and conditions on the development of the bacilli. Parallel cultures of the material from the same swab, if grown under precisely similar conditions,

but on serum media of different ages, dryness, or composition, will give organisms which are markedly different in size and type. This has been repeatedly observed, as also the effect of varying incubation temperatures.

The various factors which constitute the resistance of the patient exercise an all-powerful influence on the result of the attack. Taking this, with the circumstances just alluded to, I think it unwise to base a prognosis on such a variable character as size, though with the same medium and conditions the numerical chance seems to favor the idea that the largest bacilli are the most virulent.

The Pseudo Bacillus. The position of the so-called pseudo bacillus has not been any more clearly defined than it was a year ago. It is still maintained by some that an organism exists which, in morphological characters and staining peculiarities, is undistinguishable from the true bacillus; but that, as tested on guinea pigs or rabbits, it is devoid of virulence. Objection may be taken to this test, as pointed out by Lennox Brown in his recently published work on diphtheria. It is argued that these animals may, like horses, possess varying resistance to the toxin, and it is probable that such animals are sometimes altogether immune, as some human beings undoubtedly are. The test of virulence must therefore be made subject to this condition.

I do not propose entering into this argument, nor is it necessary in practical diagnosis to attempt any nice distinctions. Patients sent to the diphtheria hospital manifest symptoms sufficiently marked to justify their temporary admission, and bear evidence of the attack of organisms possessing some degree of virulence. For hospital purposes it is therefore proper to characterize as diphtheria all cases in which a bacillus exhibiting the peculiarities of that of Klebs Loeffler is found in the exudates or revealed by cultures.

Persistence of the Bacilli in the Throats of Patients. Discharge from the Hospital has for the past year been entirely governed by the results of bacteriological examinations of cultures from the throats of patients. It was formerly the practice to detain patients for 14 days after the disappearance of the membrane, or say 28 days from admission; but it has been proved that this is by no means a safe rule, as many would thus carry infection, while others would be kept in hospital much longer than necessary.

The shortest time for the disappearance of the bacilli was 14 days, but this may be regarded as exceptional, as the average duration of the term was 22.8 days. In 13.9 per cent. the detention was from 28 to 35 days; 5.9 per cent. between 35 and 42 days; 2.1 per cent. between 42 and 49 days, while in one instance the infection was retained until the 65th day, and another until the 75th day. The case of the second longest term is particularly interesting from the fact that it was one in which anti-toxin was employed during the early stage of the disease. The case in which the infection was retained for 75 days shows a longer duration than any cited by Park and Beebe in last year's New York statistics. Longer periods have been recorded elsewhere, as that instanced by Lennox Brown, in which 146 days elapsed after the disappearance of the membrane.

The direct economic advantages of bacteriological examination as a guide to hospital discharge will be evident from the statistics given, and it will only be necessary to indicate the still greater gain which follows the isolation of infected patients, who would otherwise go forth and sow broadcast seeds of future disease.

Pathogenic Organisms Found. In the following table organisms other than the diphtheria bacillus are widely classed as streptococci and staphylococci, but it must not be inferred that the former always indicates *Streptococcus Pyogenes*, or the latter the pus staphylococci. Tetracocci are not included. The classification was made on the microscopical characters of composite serum cultures after an incubation of 24 hours, except the tubes set on Saturday, which were allowed to remain in the thermostat till Monday. Comparisons of the results of cultures of short and long exposures do not lead to the conclusion that 24 hours was not sufficient for the development of the bacteria present.

The table covers both hospital and outside patients, 559 in all. For greater intelligibility the results are given in nearly whole percentages:

	Hospital cases.	Private cases.
B. Diphtheriæ	56 per cent.	40 per cent.
“ and streptococci	16 “	12 “
“ and staphylococci	7 “	2 “
“ with strepto. and staphylo	8 “	1 “
Streptococci only	2 “	26 “
Staphylococci only	6 “	2 “
Strepto. and staphylo	5 “	11 “
Other organisms	0 “	3 “
Sterile	0 “	1 “

Comparison of this table with a similar one submitted last year shows a greater prevalence of cases of pure diphtheria and less of the complex, or cocco-bacillary form, and also a less proportion of coccal, or non-bacillary affections. With regard to the hospital cases, this may be in part accounted for by the fact that physicians have become more careful in the selection of patients. After the first two months following the institution of bacteriological diagnosis the proportion of non-diphtheritic patients admitted was 27.9 per cent.; after six months this had dropped to 24.5; in nine months it was 21.6, and the average for last year was only 12.4 per cent.

Of the city cases the proportion is but slightly changed. The specific bacillus was present in 56 per cent. of the cultures, against 61.7 last year; the cases of non-bacillary infection being 43.4 against 36.3 per cent.

The above facts do not wholly account for the comparative absence of coccus forms, as I have noticed, with regard to *St. pyogenes aureus*—easily recognized in old cultures—that it is at times relatively prevalent, and then for months it seems to almost disappear. It was observed in 24 out of 377 primary cultures, or in 6.3 per cent. of the cases.

The classification of cases into mild, severe, very severe, and fatal groups, as revealed by clinical records, has been continued, and when taken with the bacteria observed gives a table similar to that before presented.

Table of Organisms compared with Clinical Results, July, 1895, to June, 1896, inclusive.

	Mild.		Severe.		Very Severe.		Fatal.		Total.	
	No.	Per cent.	No.	Per cent.	No.	Per cent.	No.	Per cent.	No.	Per cent.
B. Diph	102	47.9	30	14.0	45	12.1	36	16.9	213	56
B. D. & strep.....	35	50.7	9	13.0	13	17.9	12	17.4	69	18
“ staph	9	32.1	4	14.3	9	32.1	6	21.4	28	7
B. D. St. & Sp	12	60.0	4	20.0	3	15.0	1	5.0	20	6
Staph	6	100.0	.....	.....	.....	.....	.....	.....	6	2
Strep	23	100.0	.....	.....	.....	.....	.....	.....	23	6
Staph. & strep	18	100.0	.....	.....	.....	.....	.....	.....	18	5

A comparison of this and the previous table shows them to be fairly accordant, and I am able to repeat, with greater confidence, the statement that when staphylococci, or streptococci, are associated with the diphtheria bacillus, the mortality is higher than when the latter is alone present. This is in accordance with common belief. I have, however, again found that the most serious combination is that of the diphtheria bacillus with staphylococci. This disease is more malignant, and the mortality higher than under any other conditions. It will be seen that with the diphtheria bacillus alone the mortality was 16.9 per cent.; the combination with streptococci gave 17.4 per cent., while that with staphylococci showed the deaths to equal 21.4 per cent. The mild cases exhibit a reverse proportion. Thus, of 213 cases in which the diphtheria bacillus alone was present, 47.9 per cent. were mild; with 69 cases of a mixed infection with streptococci the percentage was 50.7, and of 28 cases of mixed infection with staphylococci the proportion fell to 32.1 per cent.

The combination of both staphylococci and streptococci with the specific bacillus is again shown to be of benign character. Such mixtures resulted in the reduction of the death rate to less than one-third that shown by the mixture of the diphtheria bacillus and streptococci, and less than one-quarter of the staphylococcus mixture. When it is considered that the records extend over a year and a half and include 565 cases, it can scarcely be concluded that this is the result of mere chance.

With regard to the effects of streptococci, or staphylococci, respectively, or associated together, the consequences have never been serious, nor has any case proved fatal. Such patients have generally been sent out from hospitals within a week, and in no instance has there been any return, or complaint of too hasty discharge.

Susceptibility according to Sex. The female sex continues to show greater susceptibility, or possibly greater exposure to infection, as the female hospital patients bear the relation of 59.2 per cent. to 40.8 per cent of males. This proportion corresponds fairly with the admission to the Asylum Boards' Hospital of London from 1888-94, inclusive. Of 11,598 cases 54.8 per cent. were females and 45.2 males.

Susceptibility and Mortality According to Age.

	No. of cases.	Deaths.	Per cent.
7 and under	184	44	23.9
7 to 14	92	7	7.5
14 to 21	46	1	2.2
21 to 32	55	3	5.4
			<hr/> 14.58

It will be noticed that four of the deaths were those of persons over 14 years of age. The ages were 16, 23, 26 and 32 years respectively. As far as statistics here are concerned this is a somewhat abnormal state of things, and may be in part accounted for by the statements that two of these patients were suffering from typhoid fever when attacked by diphtheria, and in the other cases, both females, one was under recovery from a severe uterine operation, and the other was worn out by poverty and disease. These conditions doubtless had an influence on the final result, but, taken as it is, the percentage of deaths in patients over 15 differs only by 0.4 per cent. from that given by the English statistics previously referred to.

Age predisposition and age mortality have been remarked everywhere, and are probably rightly ascribed by Lennox Browne to two causes: Disposition to nasal obstruction and tonsil enlargement, and the tendency in the infant to membranous exudation in all acute inflammatory conditions of the throat, irrespective of contagiousness, as compared with submucous infiltration, with cedema, in the adult.

The statement made last year as to the mild type of disease prevalent in Toronto is confirmed by further experience. The mortality for the period stated was 14.58 per cent., and for the past four years the hospital register of 1,506 cases to December, 1895, shows 18.52 per cent. The Asylum Boards' statistics, 1888-94, give a death rate of 30.3, and in the hospitals of continental Europe the mortality is much higher. I think these figures warrant the conclusion that either the bacilli are less virulent in Toronto than in European countries, or that the resistance of patients is greater.

BACTERIOLOGICAL DIAGNOSIS AS GOVERNING THE ADMISSION AND DISCHARGE OF PATIENTS IN DIPHTHERIA HOSPITALS.*

The Isolation Hospital at Toronto was established in 1891, under the control of the Local Board of Health. Up to June 30th last there were admitted 1,690 patients said to be suffering from diphtheria, as so pronounced by their attendant physicians. Diagnosis by bacteriological methods was commenced in February, 1895, and since July of that year the discharge of patients has also been governed by this means of investigation.

The statistics for this period cover 565 cases, and, when compared with those for the preceding time, afford an opportunity for ascertaining the practical value of bacteriology when applied to the purposes indicated.

It is now generally conceded that, during the early stages of those throat affections in which a membrane is formed, it is difficult, and sometimes impossible, for those most skilled and experienced in such matters, to make, by ordinary clinical signs, a certain diagnosis. Confirmation of this was afforded by the records of the first two months, which show that in 27.9 per cent. of the cases admitted the specific bacillus was absent. After five months the percentage fell to 24.5, and it has since declined so that the average for the succeeding year is 12.4 per cent.

* Read at the annual meeting of the American Public Health Association, held at Buffalo, N.Y., September, 1896.

This decrease is in some degree due to the fact that bacteriological examinations are now frequently made, at the request of city physicians, prior to patients being sent to hospital, but it is probably more largely attributed to the influence of the new system, which leads to greater care in the selection of cases. I think it may be safely said that the limitation of the number of patients from this cause amounts to about one-eighth, thus showing a corresponding saving to the institution.

Other advantages, which cannot be estimated by dollars and cents, follow the admission of the patient. If it is shown that his case is of a non-bacillary character he can be kept in an isolated ward, and thus avoid infection by the specific micro-organism—a result which would otherwise be very liable to follow. The treatment of the case is also beneficially affected by the correct knowledge at the disposal of the medical superintendent. If the diagnosis has been speedily made, the disinfection of the patient's former residence may be obviated, and the assurance that there is no danger of infection must be a great relief to the patient's friends.

It is, however, in fixing the time of discharge that bacteriological diagnosis has proved of the greatest value. It was formerly the rule that all diphtheria cases should remain in hospital for 14 days after the membrane had disappeared, or the more serious symptoms subsided, and, in the opinion of the medical superintendent, there was no danger of infection being carried out of the institution. The statistics of 1893 and 1894 show the following as the average duration of the hospital term :

1893—236 non-fatal cases	26.3 days.
1894—165 "	25.9 "
Average for two years	26.1 "

During the latter half of 1895 and the first half of 1896, in which discharge was governed by bacteriological methods, the average term was as follows :

1895-6—322 non-fatal cases	22.8 days.
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This shows a shortening of the term by 3.3 days, amounting to a total of 1,062 days for the year, and has, of course, its economic application to both hospital and patient.

This result, though direct and decisive, does not fully represent the gain. The misleading peculiarity of averages must be here taken into account in order that the case may be properly understood. 11.4 per cent. of the patients were only detained in hospital for periods ranging from 1 to 7 days, and 8.3 per cent. from 7 to 14 days. It will thus be seen that 19.7 per cent. of the whole number were discharged within the period previously fixed for convalescence only. Of those discharged within 7 days the greater proportion was composed of non-bacillary, or face diphtheria, which usually ran the more serious part of its course in that time. In some few cases the patients were sent to the General Hospital, but, in any event, they were not considered proper subjects for treatment in an isolation institution.

Quite a number were detained beyond the usual four weeks. Thus, 13.9 per cent. remained for between four and five weeks ; 5.9 per cent. between five and six weeks ; 2.1 between six and seven weeks ; while one out of the 322 retained infection until the 65th day, and another until the 75th day. These prolonged cases set off those which were speedily discharged, but still did not bring the average up to the detention under the old system.

These tedious cases in which the patient is apparently quite well, but whose throat is still the hiding place of infection, constitute one of the most common means by which diphtheria is communicated, and the supply of patients continued. In one of the most extreme of these cases it was proved that the bacilli were virulent enough to cause in 43 hours the death of a guinea pig, and it may be presumed that, with human beings, the infection would have been sufficient to have produced disease. It is in the detention of these cases that bacteriological diagnosis finds its chief use. The value of the bar thus provided against the dissemination of disease cannot be represented by any money value, though even from this low standpoint it is sufficiently apparent.

In regard to the reliability of this mode of conducting hospital discharge, I may say that, while it may not be infallible, it has proved reasonably satisfactory, and with greater experience and care, may be wholly so. On two occasions, and only two, out of the 322 under observation, was there any evidence of a recurrence of the disease in the patient, or any of those with whom he was known to come in contact. One of these was an instance of recrudescence which led to the return of a girl to hospital ; in the other there was the apparent communication of the disease to a fresh patient. It cannot be positively stated that infection came from the hospital, but it seems probable that it so originated. Granting this, the failure amounts to only 0.62 per cent., which is a fairly low limit, with a prospect of further reduction.

(Signed),

E. B. SHUTTLEWORTH, Phar. D., F.C.S.

WINDSOR.

REPORT OF THE MEDICAL HEALTH OFFICER.

WINDSOR, Ont., 18th December, 1896.

To the Chairman and Members of the Local Board of Health :

GENTLEMEN,—I now present my annual report for the year ending on 30th November, 1896.

The records received by me have been carefully gone over and show the following statistics :

The mortality of our city from January 15th, 1896, to November 30th, 1896, has been 140, our population is about 11,500, the death rate being twelve per 1,000. There were seven deaths of non-residents; nineteen deaths of children under two weeks, including still-born; forty-five deaths under five years; twenty-nine over seventy; eight deaths from typhoid fever, one non-resident being brought here having the fever; scarlet fever, twenty-three cases, no deaths; diphtheria, ten cases and two deaths.

All the medical gentlemen of Windsor were requested by the Board of Health to report every case of typhoid fever which occurred in their practice, but only two were reported before death.

The mortality of Windsor has been much less than for former years, according to its population, especially from contagious diseases. There has been no deaths from scarlet fever for over a year, and only two deaths from diphtheritic croup, both under five years of age.

Forty-three houses have been put in a sanitary condition which were defective either in plumbing or drainage.

The intake pipe has been extended out two hundred (200) feet farther, it is now beyond the centre of the channel. We commenced receiving water through it about the 27th of May last. There has been seventy-six deaths since May 27th 1896, (since the extension of the intake pipe) and only two deaths from typhoid fever, one on May 31st and the other on July 27th; two from diphtheritic croup, one September 27th, the other October 8th.

An outbreak of fever occurred about the middle of February to the middle of March, caused by heavy rainfall about February 9th, 1896, which caused the manure tanks at Walker's cattle barns to overflow, and was washed down in the Detroit river. The inlet of the intake pipe was blocked with needle ice, the valve at the shore was open, through which the water impregnated with manure entered and passed through the water mains, causing an outbreak of fever.

I have at a former time reported upon our milk supply which is much the same as formerly, the average being good.

(Signed) ROBERT LAMBERT,
Medical Health Officer.

ANNUAL REPORT OF THE BOARD OF HEALTH OF THE CITY OF WINDSOR.

To the Chairman and Members Board of Health :

GENTLEMEN,—In conformity with section 52, cap. 205, R. S. O., I have the honor of submitting for your consideration a report upon the sanitary work done under the authority of the board during the year now expiring, and upon the sanitary condition of the municipality; and in addition thereto, in compliance with the provisions of by-law No. 877, a statement showing the number of deaths registered by me from the 15th January last up to the first day of the current month, and the cause of those deaths; which latter will doubtless prove interesting and in the main very assuring to you who have the health of the city immediately entrusted to your care, and perhaps in a slightly less degree to the inhabitants at large.

Sanitary Work:—The annual cleaning up of streets, alleys, yards and private premises was begun early in the month of May and was made very thorough. Owing to the use of natural gas as fuel in a great number of establishments and residences, the accumulation of rubbish that can be consumed in coal or wood furnaces and stoves was much greater than during previous seasons; and the circumstance points to the necessity on the part of the board for adopting regulations for the care and destruction or removal of that class of materials. Upwards of 700 waggon loads were

hauled to the dumping ground on the east side of Ouellette street, south of the Coulie, twenty-nine loads of coal ashes were used to fill depressions in alleys, and six loads of brush were gathered up and burned, the cost of the work being \$310.20. Seven hundred and seventy-five detached closets have been emptied during the year, and the service executed in a satisfactory manner. The evils resulting from the custom of accumulating stable manure in alleys have still to be complained of and constitute a nuisance that demands abatement. The garbage dumping ground can no longer be used, and another place must either be purchased or rented before the spring time returns. A place for night soil for the current year has been rented from Onesime Nantais at a cost of \$50, the same being conveniently situated on McDougall street, south of the Coulie. About fifty sewer connections from buildings and lots with proper plumbing have been made during the summer, and efforts are being made to compel others to remedy defective drainage. Persistent opposition to the observance of the provisions of the excellent plumbing by-law passed in July last has still to be encountered, and it will require constant watchfulness on the part of the officers of the board to prevent violations of those provisions. Many property owners, apparently guided by false notions of economy, strive to avoid the larger first cost of good materials and mechanical work, and substitute quickly perishable material and unskilled labor. It is due to the Sanitary Inspector to say that in no case will he yield to overtures to contravene the rules respecting either drainage or plumbing; and if the first half year's experience with a thoroughly just and perfectly sanitary system provided for in the by-law mentioned be unsatisfactory, it can in no sense be attributed to indifference on the part of that officer. Six master plumbers have taken out the prescribed license, and have generally shown a willingness to second the efforts of the authorities to protect the health of the community. A series of certificates issued in the health office in the case of every job of plumbing afford owners ample security that the plumbing they may have done is properly done and completed.

Attention has been given to the quality of the milk supplied our citizens, and two tests have been made of samples procured from the dealers *without notice*—the first in February last, when forty-one lots were tested and found good, and the second on the 7th and 14th of the present month, when an aggregate of fifty-nine lots were tested and found to be generally above the standard, three only being below it.

In respect to the milk question, to render it possible to accomplish the best results, as contemplated by the council when passing the by-law, the board must needs provide the Inspector with the facilities for visiting and inspecting the various cow byres and premises where the cows from which the city supply of milk is drawn are kept, and also to observe the process of milking and canning, for it is apparent that in no other manner can the consumers be assured of the enforcement of proper steps to secure freedom from contamination. These places are situated at remote distances from each other, very few of them within the city limits, and at least three townships and two towns containing some of them. The Inspector should either be paid sufficiently to justify his keeping a conveyance, or he should be duly authorized to hire one at stated intervals for a sufficient number of days in which the circuit can be made, and the first suggested plan will doubtless commend itself to your favor, especially as in several other branches of his official work, locomotion on foot is altogether too slow.

The ever important question of water supply has not been permitted to rest the current year. To place the intake beyond the reach of possible contamination by sewage, the water board extended the intake pipe 200 feet farther from the Windsor shore than the former one, or 500 feet in all, which carries it beyond the centre of the main channel. This it is claimed, and analyses establish the claim, that much purer water is thus obtained—in fact as any portion of the river affords. But the evil of clay-admixture during stormy weather still continues, and although the foreign element may not be unwholesome, it is undoubtedly not agreeable to the eye; and the Commissioners have decided upon and are now having constructed a filtering plant guaranteed to remove ninety-five per centum of the bacteria that may infest the water and furnish an article absolutely free from other impurities. If this guarantee be practically worked out, the complaints that have unsettled the minds of our citizens and given Windsor a questionable name abroad will no longer be heard.

In respect to contagious diseases, the municipality has been exceptionally fortunate. The number of cases reported have been as follows: Scarlet fever, twenty-three; diphtheria, twelve; diphtheritic croup, two; typhoid fever, two. However, except in cases when death ensued, the number of cases of the last mentioned disease were not reported, none having been received since March 2nd, and the Board has no means of ascertaining how many have occurred.

Sanitary Condition:—At no other time in the history of this town, at any rate since the organization of a Board of Health, has the sanitary condition been as satisfactory as at present. There is still room for improvement no doubt; and with persistent efforts in enforcing existing rules, it is only reasonable to expect that Windsor, with its many admirable sewers, clean thoroughfares, and abundant water supply for all purposes, will soon occupy the front place among the cities of America in the matter of health.

Number of Deaths and their Causes:—The total number of deaths registered up to the first of December is 145, one of which occurred many years ago and was recorded by special direction of the Registrar-General. The causes of death as certified by the attending physicians number sixty-eight, which number could perhaps be slightly reduced by an expert in such matters. The following table shows the number who died from each of the diseases (or causes) named :

Anuerism	1	During birth	2
Drowned	1	Stillborn	7
Diarrhoea	2	Operation for gall stone	1
Abscess of brain	1	Disease of brain	1
Cancer of stomach	1	Infantile consumption	1
Tuberculosis	3	Convulsions	3
General debility	3	Cerebral hyperemia	1
Pneumonia	5	Paralysis of brain	1
Unknown	2	Stoppage of bowels	1
Septicæmia	1	Broncho pneumonia	2
Cancer	7	Pythiosis	5
Heart failure	1	Cerebral anæmia	1
Cellulitis and peritonitis	1	Delirium tremens	1
Consumption	4	Myocarditis	1
Gastritis	1	Spina bifida	1
Apoplexy	2	Hepatic obstruction	1
Carconoma	1	Meningitis	2
Marasmus	5	Uræmia	1
Senile decay	1	Tubercular meningitis	2
Chronic bronchitis	2	Operation for removal of tumor	1
Heart disease	9	Indigestion	1
Malarial fever	1	Brain fever	1
Abscess of lung	1	Enlargement of spleen	1
Locomotor ataxia	1	Diphtheria-croup	2
Cholera infantum	2	Trismus nascentium	2
Pulmonary hemorrhage	1	Puerperal septicæmia	1
Typhoid fever	8	Congestion of brain	1
Peritonitis	4	Dysentery	1
Bright's disease	2	Paralysis	2
Valvular disease of heart	1	Malnutrition	2
Extreme age	7	Hanging	1
Dropsy	1	Diabetes	1
Abscess of pharynx	1	Pistol shot	1
Premature birth	5	Pancreatis	1

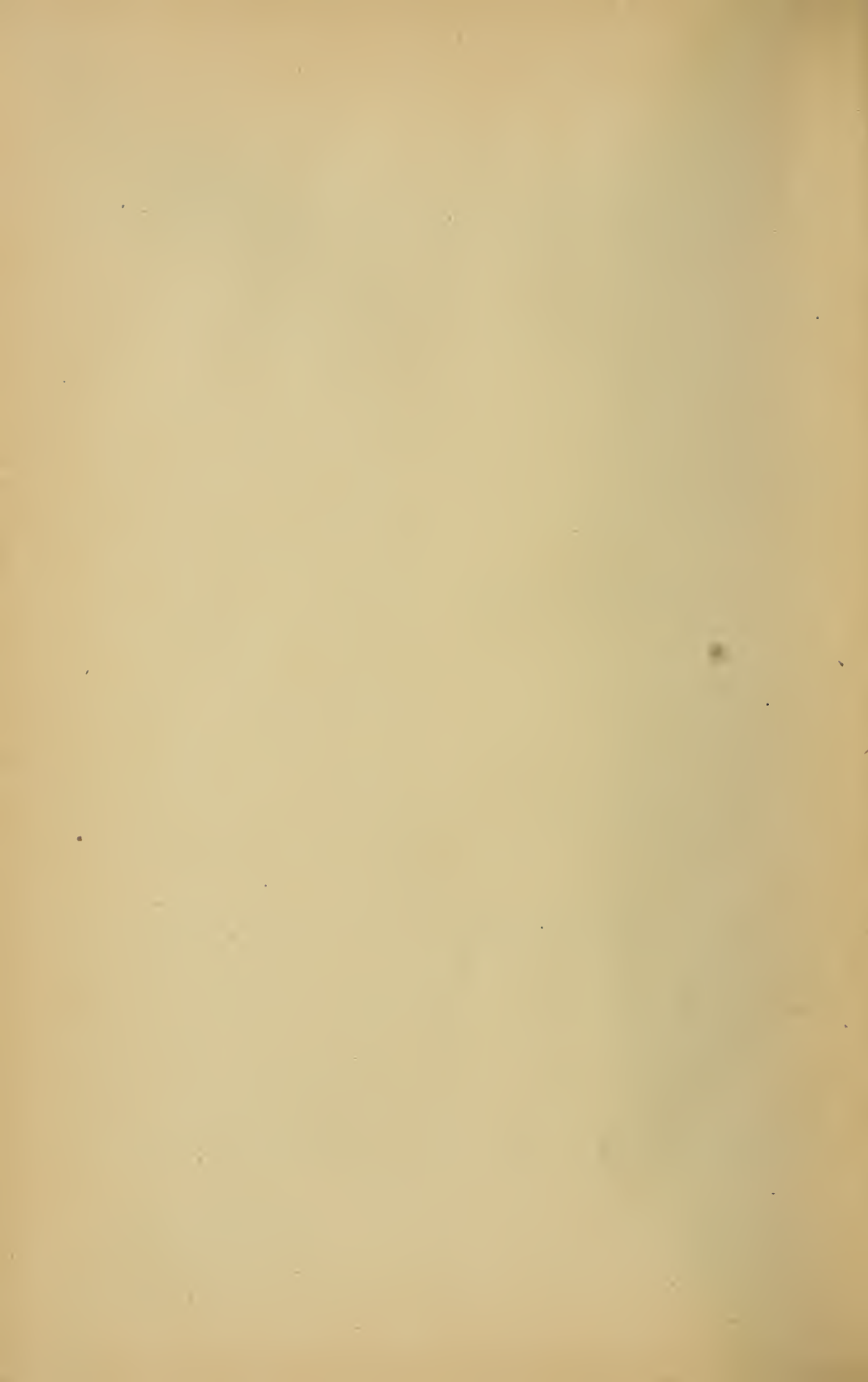
Under the new Registration Act the register of deaths will remain permanently in the custody of the city clerk, by which change it will be a simple matter hereafter to give statistics for the full twelve months in the annual report to the board. Up to the present year the register has been semi-annually forwarded to the Registrar-General, namely, on the 15th January and 15th July, in consequence of which arrangement the deaths occurring from the date of a report to the 15th of the following January were not accessible to the Secretary when preparing the report.

In the opinion of the board, the Health Act should be amended so as to make it obligatory upon all practising physicians, in addition to the immediate report now required to be made by them of contagious diseases, to report at the end of each succeeding month all contagious diseases, including typhoid fever and measles, that may have come under the observation during the month, or in the event of no such diseases having during that period come under their observation, to report that fact; and the attention of the Provincial Board of Health is hereby directed to this matter in the hope that the board will take the necessary steps to bring about the said change in the law.

Respectfully submitted,

STEPHEN LUSTED,

Secretary B. of H.



APPENDIX.

ANNUAL REPORTS OF CITIES, TOWNS, VILLAGES AND TOWNSHIPS
WITH TABULAR REPORTS OF SPECIAL SANITARY CONDITIONS.

CITIES.

REPORT to the Provincial Board of Health containing Summary of Replies

Name of Municipality.	Names of Medical Health Officer and Sanitary Inspector.	Is there general sanitary inspection? Is it repeated at intervals every year? or is action taken only when complaint of nuisance is made to Board.	Contagious diseases.
Belleville	R. Tracy, M.D.; W. Morton, S. I.	Yes; yes	Typhoid, 102 cases; 17 deaths...
Brantford	Egerton Griffin, M.D.....	Yes; yes	Diphtheria, 10 deaths; typhoid, 5 deaths
Chatham	Wm. R. Hall, M.D.; Jos. Guttridge, S. I.	Yes, two thorough and systematic inspections made each year.	Scarlatina, 1 case; diphtheria, 23 cases, 2 deaths; typhoid 20 cases.
Guelph	H. Howitt, M.D.; Capt. Wm. Clarke, S. I.	Yes; every spring and when Board considers it advisable.	Scarlatina, 8 cases, 1 death; diphtheria, 37 cases, 5 deaths; typhoid, 19 cases, 1 death.
Hamilton	Isaac Ryall, M.D	Yes	Diphtheria, 61 cases, 9 deaths; scarlet fever, 47 cases; typhoid fever, 119 cases, 5 deaths.
Kingston	Samuel H. Fee, M.D.; W. S. Gordon, S. I.	Yes	Scarlet fever, 6 cases; diphtheria, 101 cases, 13 deaths; typhoid, 41 cases, 3 deaths.
London	T. V. Hutchinson, M.D ..	Yes	Typhoid, 64 cases, 4 deaths; diphtheria, 22 cases, 6 deaths; scarlet fever, 9 cases, 1 death.

CITIES.

to a Circular *re* Sanitary Condition of the Municipality for the year 1895.

Is isolation of contagious diseases systematically carried out? State methods adopted and whether any isolation hospital exists.	Is Diphtheria anti-toxine in common use by physicians? Give results of treatment in all cases where possible.	Is disinfection after contagious diseases carried out under the personal supervision of an officer of the Board?	Does the Board make systematic inspection of the public schools? Does it require a certificate of vaccination from new school children each year?
Yes; placarding house and removal to isolated ward in hospital, fumigating of premises and complete isolation of patients.	Not required; no cases..	Yes	Yes; no.....
Yes; yes .....	.....	Yes	Yes; yes
Yes, as thoroughly as we can in patient's residence, when for good reasons it is not practicable to remove to the contagious annex to St. Joseph's Hospital.	Yes; results have been good.	Yes	No; no
Yes; we have an isolation hospital for diphtheria and scarlet fever, and a separate building for smallpox patients.	Yes, for the last 5 months, and results have been good, though 2 cases of eruption followed its use.	Yes	No systematic inspection of schools; a certificate of vaccination required.
Yes .....	.....	Yes	Yes; yes
Yes, in all cases	No; the opinion of physicians who have used, is of a satisfactory character.	No, but enquiries are made in all cases, and the proper disinfection of the premises recommended by the physician in charge.	No; no
Yes .....	.....	Yes	Yes; yes

CITIES.—Continued.

REPORT to the Provincial Board of Health containing Summary of Replies

Name of Municipality.	Are forms for notification by teachers and M. H. O. of contagious diseases, supplied? If not, will you explain the reason?	Give the source of water supply used on the premises. Also cause of typhoid fever cases.	Is there systematic inspection of dairy cows made during the year. Have cases of tuberculosis occurred, and state whether the tuberculin test has been used.	How many slaughter houses in municipality? Are they licensed on evidence of being kept in good sanitary condition? How is offal disposed of? Is there systematic inspection of carcasses by any officer of the Board.
Belleville	Yes	Wells and public water supply.	Yes; no.....	None
Brantford	Yes .....	.....	Yes .....	.....
Chatham	Yes	We have not had any cases of typhoid where the city water was used exclusively, and believe well water to be the cause of all our cases.	Yes, one case of lump jaw; tuberculin has not been used.	None
Guelph	Yes	Part city water supply; most of typhoid cases were contracted outside of city.	No; no tuberculin test.	4; no license required; inspected when complaint is made, offal removed.
Hamilton	Yes .....	.....	.....	.....
Kingston	Yes	Lake Ontario and well water; in some cases the cause is attributable to well water.	Yes; no	4; not licensed; offal fed to hogs; no.
London	Yes .....	.....	Yes .....	.....

CITIES.—Continued.

to a Circular *re* Sanitary Condition of the Municipality for the year 1895.

Is there systematic removal of garbage, and night soil? If so on what basis of cost is the removal made. How is cost calculated?	Is there a public sewerage system? If so what proportion of houses to whole is connected with public sewers.	State No. and kind of noxious trades. (See sec. 63 Public Health Act.) How licensed and regulated?	Have there been any prosecutions during year under Public Health Act? State in detail the nature of the case, and results of same.
Yes; by the citizens who pay for its removal; no complaints.	Gradually carrying out this system.	Tallow rendering, not licensed.	1 case in court.
Yes	Yes .....	.....	.....
There is of night soil but not of garbage; cost of removal is paid by owners of premises at 10c. per cubic foot.	Yes; 10 per cent	None	No.
Yes	No public sewerage system.	Yes; slaughter houses; storing hides.	No.
Yes	Yes	None	No.
Yes	Yes	Yes; 4 slaughter houses, 2 tallow melting, 3 storing hides not licensed, but subject to inspection.	Yes, 18 cases; 1 for insufficient drainage; 1 for insufficient trapping and ventilation, and 16 for foul privy pits.
Yes	Yes	None	No.

CITIES.—*Concluded.*

REPORT to the Provincial Board of Health containing Summary of Replies

Name of Municipality.	Names of Medical Health Officer and Sanitary Inspector.	Is there general sanitary inspection? Is it repeated at intervals every year? or is action taken only when complaint of nuisance is made to Board.	Contagious diseases.
Ottawa	A. Robillard, M.D. . . .	Yes	Scarlatina, 122 cases, 8 deaths; diphtheria, 153 cases, 36 deaths; typhoid, 295 cases, 20 deaths.
Stratford	J. A. Robertson, M.D.	Yes	Typhoid, 33 cases with 3 deaths; scarlatina, 40 cases, with 1 death; diphtheria, 2 cases.
St. Catharines..	Andrew Boulden, S. I.	General sanitary inspection twice each year.	Scarlatina, 8 cases; diphtheria, 19 cases, 2 deaths; typhoid, 7 cases, 4 deaths.
St. Thomas	W. C. VanBuskirk, M.D.; W. J. Shaw, S. I.	Yes, in the spring time ...	Scarlatina, 37 cases; diphtheria, 94 cases, 9 deaths; typhoid, 12 cases, 2 deaths.
Toronto	Chas. Sheard, M.D.	General house to house inspection once a year and as often as complaints are received.	Scarlatina, 114; diphtheria, 507; typhoid, 365.
Windsor	R. Lambert, M.D.; Donald Grieve, S. I.	General and systematic....	Scarlatina, 23, deaths 2; typhoid cases not reported, but 8 deaths occurred.

CITIES.—*Concluded.*to a Circular *re* Sanitary Condition of the Municipality for the year 1895.

Is isolation of contagious diseases systematically carried out? State methods adopted and whether any isolation hospital exists.	Is diphtheria anti-toxine in common use by physicians? Give results of treatment in all cases where possible.	Is disinfection after contagious diseases carried out under the personal supervision of an officer of the Board?	Does the Board make systematic inspection of the public schools? Does it require a certificate of vaccination from new school children each year?
Two isolation hospitals maintained in good working order for that purpose.	Generally used by physicians and generally found an effective remedy when cases can be reached in time (i.e.) within 48 hours.	Yes, as a rule	No; no
.....	.....	Yes .....	.....
Yes, by placarding the house and removal to isolation hospital if necessary.	Anti-toxine has only been used in a few cases, but successfully.	Yes; by sanitary inspector.	Compulsory vaccination whenever required.
Yes, since the visit of Dr. P. H. Bryce, Secy. of P. B. on Oct. 27th, 1896. Persons having infected homes are quarantined for 21 days; no isolation hospital.	No; it has been used in 5 cases with very satisfactory results.	Physician in charge generally attends to disinfection.	No systematic inspection; no certificate of vaccination required.
Yes; infected inmates of houses where contagious diseases have been are quarantined; premises are visited daily by quarantine officer.	.....	Yes; all goods removed to disinfecting station, and submitted to 230 F°; premises then washed out with hy. ct. 1 in 1,000; a special officer kept for disinfecting houses.	Yes
Yes .....	.....	Yes	Yes, as to inspection....

CITIES.—*Concluded.*

REPORT to the Provincial Board of Health containing Summary of Replies

Name of Municipality.	Are forms for notification by teachers and M. H. O. of contagious disease, supplied? If not, will you explain the reason?	Give the source of water supply used on the premises. Also cause of typhoid fever cases.	Is there systematic inspection of dairy cows made during the year. Have cases of tuberculosis occurred, and state whether the tuberculin test has been used.	How many slaughter houses in municipality? Are they licensed on evidence of being kept in good sanitary condition? How is offal disposed of? Is there systematic inspection of carcasses by any officer of the Board.
Ottawa	Yes	Ottawa river; majority possibly from contaminated water.	No systematic inspection.	None
Stratford	Yes			
St. Catharines..	Forms supplied to teachers by Local Board.	Waterworks and a few wells; typhoid usually traced to well water.	Monthly inspection of dairy cows; no cases of tuberculosis have occurred.	3; no license is required; market inspector inspects all meat offered for sale.
St. Thomas	No		No inspection; no tuberculin test.	1; licensed; offal is removed daily to farm land as fertilizer.
Toronto	Yes	City water supply from Lake Ontario; sporadic and imported cases.	General inspection made; tuberculin test not made; have no knowledge of tuberculosis existing.	35; a permit is issued on evidence of the premises being kept in good sanitary condition; offal is removed from premises daily; yes; daily inspection of market and carcasses.
Windsor	Yes	Detroit river	Not yet systematic; no.	None.

CITIES.—*Concluded.*to a Circular *re* Sanitary Condition of the Municipality for the year 1895.

Is there systematic removal of garbage, and night soil? If so on what basis of cost is the removal made. How is the cost calculated?	Is there a public sewerage system? If so what proportion of houses to whole is connected with public sewers.	State No. and kinds of noxious trades. (See sec. 63 Public Health Act.) How licensed and regulated?	Have there been any prosecutions during year under Public Health Act? State in detail the nature of the case, and results of same.
Night soil is removed by contract to farm lands; garbage is removed at cost to parties having it.	Yes; about two-thirds.	1 storage of hides; 1 soap boiling; 1 gas manufacture; 1 junk store.	16 as follows: 12 for violation of Health Act; 4 in connection with report of infectious diseases, with 2 convictions.
Yes, by scavengers; cost 25c. per bbl., and paid by persons requiring the work done.	Have a system of sewers for surface drainage.	Tanneries 3; soap factory 1, hide storage 1.	No.
Removed by private parties	Yes		2; 1 party for keeping refuse and garbage to feed a sow, another party for making his yard offensive by refuse from kitchen.
Yes; garbage cremated; night soil removed by private contractors.	Yes; estimated about 20,000 houses in Toronto provided with plumbing and drainage systems.		67 summonses were issued for violation of Public Health Act and city by-law; 16 fines were imposed; in 51 cases the work was done and cases withdrawn.
Yes	Yes	None	No.

TOWNS.

Name of Municipality.	Names of Medical Health Officer and Sanitary Inspector.	Is there general sanitary inspection? Is it reported at intervals every year? or is action taken only when complaint of nuisance is made to Board.	Contagious diseases.
Almonte	Thomas Leavey, S. I.	General inspection once a year and repeated when necessary.	Diphtheria, 3 cases.....
Aylmer .....	.....	Yes; twice a year.....	Scarlatina, 6 cases
Barrie	L. Oliver, M.D.; R King, S. I. ....	.....	Diphtheria, 27 cases, 4 deaths. ..
Berlin.....	Dr. Lackner: H. Winterhalt, S. I.	Yes.....	Scarlatina, 2 cases; diphtheria, 9 cases, 3 deaths; typhoid, 1, death.
Bowmanville ...	B. Lammiman, M.D.; R. Jarvis, S. I.	Once a year in the spring and at intervals as required.	Scarlet fever, 11 cases, 2 deaths; diphtheria, 7 cases, 2 deaths; typhoid, 2.
Bracebridge	S. Bridgland, M D.; Thos. Dodd, S. I.	Yes	Diphtheria, 4 cases; typhoid, 2 cases.
Brampton	John T. Mullin, M.D., John Fingland, S. I.	Yes; twice a year.....	Typhoid, 7 cases
Brockville	W. E. Harding, M.D.; W. H. Edwards, S. I.	Once each year	Scarlatina, 31; diphtheria, 25 cases, 5 deaths; typhoid, 23 cases, 7 deaths.
Clinton	J. W. Shaw, M. D.; J. Wheatley, S. I.	Yes; every May and when complaints are made.	Scarlatina, 1; typhoid, 7; 1 death.
Cobourg	E. E. McNichol, M.D.; Wm. Rourke, S. I.	Inspection once a year . . .	Scarlatina, 30 cases, 2 deaths; diphtheria, 17 cases, 2 deaths, typhoid, 16 cases.

TOWNS.—Continued.

Is isolation of contagious diseases systematically carried out? State methods adopted and whether any isolation hospital exists.	Is Diphtheria anti-toxine in common use by physicians? Give results of treatment in all cases where possible.	Is disinfection after contagious diseases carried out under the personal supervision of an officer of the Board?	Does the Board make systematic inspection of the public schools? Does it require a certificate of vaccination from new school children each year?
Yes, but isolation confined to residence.	.....	No	No; not particularly only as to out buildings and general cleanliness of schools.
Yes, when required	No cases in municipa'lity.	Yes	No; no
Yes, as circumstances permit; family quarantined; patient isolated; no hospital.	No; some will not use it; not used to any extent until last outbreak; all recovered except one of the two who first took it.	Yes	No; sanitary inspector is truant officer and has constant communication with the schools.
Yes; houses placarded; other members of family removed to other premises or kept from patients.	No; has been used in 3 or 4 cases, all recovered.	No	No; no
Yes, usual methods; no hospital.	.....	Yes	No; no
Isolated in their homes	Don't know	Under supervision of physician.	No
Physicians in charge of patients enforce isolation.	No	Yes	Yes; no
Yes	In only one or two cases, with negative results.	No; under the supervision of attending physicians.	Yes; no
Yes; soon as reported; house placarded; high and public schools notified; inspection by M.H.O. with full information given to disinfect.	No cases; no treatment.	Yes	Only on complaint; no..
Isolation carried out as systematically as possible.	Has been used several times with apparent good results.	Disinfection is carried out by sanitary inspector.	Yes

TOWNS.—Continued.

Name of Municipality.	Are forms for notifications by teachers and M. H. O. of contagious diseases supplied? If not, will you explain the reason?	Give the source of water supply used on the premises. Also cause of typhoid fever cases.	Is there systematic inspection of dairy cows made during the year. Have cases of tuberculosis occurred, and state whether the tuberculin test has been used.	How many slaughter houses in municipality? Are they licensed on evidence of being kept in good sanitary condition? How is offal disposed of? Is there systematic inspection of carcasses by any officer of the Board.
Almonte	Yes . . . . .	.....	No cases	Three on outskirts of town, under inspection.
Aylmer	Yes	Wells	No; no	None
Barrie	Have been informed teachers use them.	Wells	Inspected once a year; none known to Board.	Three; not licensed but inspected; fed to hogs; no.
Berlin	No	From waterworks; not traceable.	No; some cases of tuberculosis have occurred in vicinity; the tuberculin test has been used and given true results.	Nine; yes; in majority of cases used for fertilizing purpose; only partial inspection.
Bowmanville	Physicians are supposed to be supplied, but not teachers.	Wells	No dairies within municipality.	Four; no license
Bracebridge	Supplied to physicians.	By waterworks and wells.	No	Two; slaughterhouses permitted on condition of being kept in good sanitary condition; offal fed to hogs; no inspection of carcasses.
Brampton	Supplied to physicians only.	Wells	No; no	Four; no license
Brockville	Yes	Waterworks and a few wells.	No; by-law to provide for this has passed the council; no tuberculosis.	None
Clinton	Yes	Wells; chiefly water and badly ventilated houses.	Yes; none; have not tested; cannot obtain tuberculin.	Four; offal fed to hogs no inspection.
Cobourg	Yes	Waterworks and wells . .	Annual inspection of dairies; no tuberculosis.	Three; licensed, \$25 per annum; offal burned and fed to hogs.

TOWNS.—Continued.

Is there systematic removal of garbage, and night soil? If so on what basis of cost is the removal made. How is cost calculated?	Is there a public sewerage system? If so what proportion of houses to whole is connected with public sewers.	State No. and kind of noxious trades. (See sec. 63 Public Health Act.) How licensed and regulated?	Have there been any prosecutions during year under Public Health Act? State in detail the nature of the case, and results of same.
Made once a year; expenses paid by each household.	No	None	One prosecution, but nuisance was removed.
Yes	No	None	Cases laid, but parties complied with regulations before court.
Night soil, yes, from pits at \$1.50 per cubic yd; from boxes at 30c. per month.	Yes, about $\frac{1}{3}$ or $\frac{1}{4}$	Slaughtering and gas man'g; inspected; not licensed.	No.
Not yet; by-law has been passed to regulate this matter in the future.	Yes; about $\frac{1}{2}$	9 slaughterhouses; 1 gas manufactory, 1 glue factory.	One, on disposal of garbage: party fined.
Persons appointed to remove it at expense of owner on terms agreed upon.	No	None	No.
No; night soil removed at expense of the parties.	No	None, except slaughterhouses.	Eight prosecutions; six convictions.
Removed by individuals at their own expense.	No	One gas house	None.
Not of garbage, but night soil is removed at 50c. per bbl. of 45 gals.; 25c. paid to scavenger and 25c. to town.	Yes; about $\frac{1}{3}$ of houses are connected.	1 storage in tannery for hides; one glue shop; 1 gas co'y.; all inspected.	None.
Yes; by each ratepayer ..	None	None	None.
No; sanitary inspector makes inspection, and cellars, privy pits, etc., are cleaned at owner or tenant's expense.	Partial sewerage system; one-twentieth of the houses are connected.	Three; storage for hides.	None.

TOWNS.—*Continued.*

Name of Municipality.	Names of Medical Health Officer and Sanitary Inspector.	Is there general sanitary inspection? Is it repeated at intervals every year? or is action taken only when complaint of nuisance is made to Board.	Contagious diseases.
Collingwood.....	A. R. Stephen, M.D.; B. F. Lewis, S. I.	General inspection.....	Typhoid, a few cases.....
Cornwall	C. J. Hamilton, M.D.; A. C. McDonald, S. I.	Yes; yes.....	Diphtheria, 10 cases, 1 death typhoid, 12 cases, 4 deaths.
Dresder.....	No M. H. O.; Ed. Gonyon, S. I.	Yes; yes, no	Diphtheria, 3 cases, 1 death typhoid, 1 case.
Dundas	Thos. A. Bertram, M.D. .	Sanitary inspector covers the ground regularly and sees all premises are properly cleaned of refuse, etc.	Diphtheria, 1 case, mild type, typhoid, 4 cases.
Essex	Jno. W. Bri'n, M.D.; John Gormley, S. I.	General inspection.....	Diphtheria, 2 cases; typhoid, 14 cases.
Forest	Walter Boyd, M.D.; Wm. Gillies, S. I.	Yes; yearly.....	None reported.....
Galt	James S. Wardlaw, M.D.; Adam Kay, S. I.	Yes; yes	Diphtheria, 3 cases, 1 death; typhoid, 28 cases, 1 death.
Goderich	W. J. R. Holmes, M.D....	Yes; yes	Typhoid, 2 cases.....
Gore Bay	J. J. Johnston, M.D.; E. L. Brazenor, S. I.	No; no; yes ..	None
Gravenhurst ...	—Cornell, M.D.; Archy Sloan, S. I.	Yes	Typhoid, 1 case
Kincardine	N. Hopkins, M.D.; John Pratt, S. I.	Yes	Typhoid, 20 cases, 1 death
Leamington	No M. H. O.; Jno. Gilbert, S. I.	Yes	Typhoid, 1 case, 1 death
Lindsay.....	J. McAlpine, M.D.	Yes.....	Diphtheria, 2 cases, 1 death; scarlet fever, 3 cases, 1 death; typhoid, 26 cases, 5 deaths.

TOWNS.—Continued.

Is isolation of contagious diseases systematically carried out? State methods adopted and whether any isolation hospital exists.	Is diphtheria anti-toxine in common use by physicians? Give results of treatment in all cases where possible.	Is disinfection after contagious diseases carried out under the personal supervision of an officer of the Board?	Does the Board make systematic inspection of the public schools? Does it require a certificate of vaccination from new school children each year?
No	No	Yes	No; no
Isolation is systematically carried out by removal to other quarters.	Yes; physicians in town use it with good results.	Yes, under M.H.O	Yes; yes
Under direction of the medical attendant; no hospital.	No; no data	Yes, under supervision of medical attendant.	No; yes
.....
No hospital, but quarantine system thoroughly carried out.	Yes; favorable results..	Yes	Yes; yes
Yes; by isolation, fumigation and destruction of all clothes, etc.; no hospital.	None reported	Yes	Yes; yes
Yes, patients isolated, family quarantined; no hospital.	Yes; two cases successful.	Yes	Yes; no
Had none	No diphtheria	Yes	No; no
No; none	None	Yes	No
Yes	No	No	No; no
No hospital; best under the circumstances.	.....	Yes	No
House placarded; none	No	No	No; yes
.....	.....	.....	Yes; yes

TOWNS.—Continued.

Name of Municipality.	Are forms for notification by teachers and M. H. O. of contagious diseases supplied? If not, will you explain the reason?	Give the source of water supply used on the premises. Also cause of typhoid fever cases.	Is there systematic inspection of dairy cows made during the year. Have cases of tuberculosis occurred, and state whether the tuberculin test has been used.	How many slaughter houses in municipality? Are they licensed on evidence of being kept in good sanitary condition? How is offal disposed of? Is there systematic inspection of carcasses by any officer of the Board.
Collingwood....	Yes	Lake	No; no	Four; no.....
Cornwall	No	River St. Lawrence water; some wells; bad water.	No; no	Three; not licensed but inspected by M.H.O.
Dresden.....	Yes	Wells	No; no cases; test has been made; dairy cows kept by farmers outside municipality.	None; no inspection of carcasses.
Dundas .....	.....	.....	.....	.....
Essex	Yes	Artesian well; by germs coming in contact with food, milk, etc.	No; tuberculosis not been discovered in cows; no test made.	None
Forest	Yes	Wells; none	No; no	3; kept in sanitary condition; boiled or fed to hogs: no.
Galt	Yes	Town water supply and wells; mostly imported cases.	Yes; no	None; yes by township authorities; boiled and fed to hogs; yes, by inspection.
Goderich	No .....	.....	No; no	None.....
Gore Bay	Yes	Wells and lake	No; no; no.....	2; not licensed; fed to pigs; no.
Gravenhurst....	Yes .....	.....	No; no	None.....
Kincardine	Yes	Lake and well water; can't state cause of typhoid.	No dairy in town ..	3; no inspection of carcasses by any officer.
Leamington	No	Wells and water system.	No	None.....
Lindsay .....	.....	Wells; samples of water have been examined and found unfit for use.	.....	.....

TOWNS.—Continued.

Is there systematic removal of garbage and night soil? If so on what basis of cost is the removal made. How is the cost calculated?	Is there a public sewerage system? If so what proportion of houses to whole is connected with public sewers.	State No. and kinds of noxious trades. (See sec. 63 Public Health Act.) How licensed and regulated?	Have there been any prosecutions during year under Public Health Act? State in detail the nature of the case, and results of same.
Yes; 15 cents per month for each householder.	.....	.....	No.
Yes; 50c. per bbl	Yes, through part of town; about $\frac{1}{3}$.	Storing of hides; m'fg. of gas; not licensed.	No.
Yes; by parties at their own expense.	No	None	None.
.....
Yes, by a man employed; each ratepayer pays for his removal.	None	None	Yes; owner of Chinese laundry for keeping stagnant wash water on premises.
Yes; each ratepayer is charged according to amount.	No	None	Yes; for selling diseased meat; no conviction.
No; by private contract..	No; partial	None	None.
Yes; 50c. per bbl	No; building one.....	None	None.
No	No	None	None.
No	No	None	No.
Householder is responsible for removal.	None.....	None	No.
No	No	None	No.
.....

TOWNS.—*Continued.*

Name of Municipality.	Names of Medical Health Officer and Sanitary Inspector.	Is there general sanitary inspection? Is it repeated at intervals every year? or is action taken only when complaint of nuisance is made to Board.	Contagious diseases.
Listowel . . .	T. W. Thompson, M.D.; R. Balmer, S. I.	Yes; yes	Scarlatina, 4 cases; diphtheria, 4 cases.
Little Current..	No M.H.O.; John Brown, S. I.	. . . . .	None
Meaford	J. G. Clarke, M.D.; Jas. Anderson, S. I.	Action taken when complaint is made.	Scarlatina, 2 cases; typhoid, 4 cases.
Midland	F. G. Wallbridge, M.D.; Thos. Shipcot, S. I.	General inspection in Mar. and April.	Scarlatina, 3 cases; diphtheria, 2 cases; typhoid, 8 cases, 1 death.
Mount Forest ..	No M. H. O.; R. Armstrong, S. I.	General inspection twice a year.	Scarlet fever, 1; typhoid, 18....
Morrisburg . . .	W. P. Chamberlain, M.D.; C. Casselman, S. I.	. . . . .	. . . . .
Napanee	No M.H.O.; E. B. Parry, S. I.	House to house inspection in spring.	Scarlatina, 1 case; diphtheria, 6 cases; typhoid, 1 case.
Niagara Falls ..	J. W. Oliver, M.D.; Saml. Ward, S. I.	Yes	Typhoid fever
North Toronto..	L. R. Richardson, M.D.; G. H. Lawrence, S. I.	Not this year	None
Newmarket	D. M. Campbell, M.D.; P. I. Anderson, S. I.	In spring a general inspection is made.	Scarlatina, 3 cases
Oakville	J. S. M. Williams; M.D.; G. J. Sumner, S. I.	Yes; yes; no.	Scarlatina, 40 cases; diphtheria, 6 cases; typhoid, 10 cases.
Orangeville	T. H. Henry, M.D.; Robt. Shields, S. I.	Yes	Scarlatina, 1; diphtheria, 21 cases, 4 deaths.
Owen Sound....	Allan Cameron, M.D.;—McAulay, S. I.	Complete inspection once a year.	Scarlatina, some cases; diphtheria, 7 cases, 2 deaths; typhoid, 34 cases, 5 deaths.

TOWNS.—Continued.

Is isolation of contagious diseases systematically carried out? State methods adopted and whether any isolation hospital exists.	Is diphtheria anti-toxine in common use by physicians? Give results of treatment in all cases where possible.	Is disinfection after contagious diseases carried out under the personal supervision of an officer of the Board?	Does the Board make systematic inspection of the public schools? Does it require a certificate of vaccination from new school children each year?
Yes, by attending physician.	No	Yes	No
.....	.....	Not required	No
Isolation of contagious diseases carried out by house holder and attendants.	Think not	M. H. O. will have this under his personal supervision.	.....
In private houses	Not used	Yes	Yes; no
No hospital; physicians are particular about isolation of patients and disinfection.	Don't know	No; left to attending physician.	No
When there are any cases....	No cases	Yes, where any cases exist.	Only on complaint; no ..
House is placarded; no hospital.	Yes	Left with medical attendant.	No; no
No; no hospital	No, not used; no occasion	Yes	No; no
Patient is isolated in house, and the usual disinfection used, to the satisfaction of M. H. O.; no hospital.	.....	Yes; no contagious diseases this year.	Schools in good sanitary condition; don't require certificate of vaccination.
Yes; no hospital	No; no cases of diphtheria.	Yes	No; no
Yes; no	No; good; no deaths ..	Yes	Yes; no
Patient placed in separate room, house placarded.	No ..	Generally medical attendant.	Yes; no
Yes	No	Yes	No; no

TOWNS.—Continued.

Name of Municipality.	Are forms for notification by teachers and M. H. O. of contagious diseases supplied? If not, will you explain the reason?	Give the source of water supply used on the premises. Also cause of typhoid fever cases.	Is there systematic inspection of dairy cows made during the year. Have cases of tuberculosis occurred, and state whether the tuberculin test has been used.	How many slaughter houses in municipality? Are they licensed on evidence of being kept in good sanitary condition? How is offal disposed of? Is there systematic inspection of carcasses by any officer of the Board.
Listowel	No	Wells	No; no cases of tuberculosis.	None; no
Little Current..	Not required ...	Springs, wells and lake..	Don't know	One; inspected.....
Meaford	Yes	Wells and waterworks ..	None	None near centre of town; no inspection of carcasses.
Midland ....	.....	Wells .....	.....	One; inspected by M.H. O.
Mount Forest ..	Principal of school notified.	Wells; mostly attributed to water.	No	Two; not licensed but inspected; every animal inspected before it is slaughtered.
Morrisburg ...	No	No cases.....	No inspection; no cows.	None.....
Napanee	Yes	Wells	No	One; no inspection of carcasses.
Niagara Falls ..	Yes	Niagara river	No examination; no cows.	None.....
North Toronto..	Yes	Spring wells, and waterworks.	No inspection this spring; one case of tuberculosis reported; cow was destroyed.	Eight; carried away from premises.
Newmarket ...	Yes	Schools supplied from artesian wells; no typhoid cases.	None	None.....
Oakville.....	No	Wells	No; none	One; no; yes; burned; no.
Orangeville	Yes,	Water is secured from waterworks.	No; no	Four; outside corporation; not licensed; offal fed to hogs.
Owen Sound ...	Yes	Waterworks and some wells; supposed to be epidemic.	No; two cases of tuberculosis, both animals were destroyed; test has not been made.	One; kept in sanitary condition; offal fed to hogs; no inspection of carcasses.

TOWNS.—Continued.

Is there systematic removal of garbage and night soil? If so on what basis of cost is the removal made. How is the cost calculated?	Is there a public sewerage system? If so what proportion of houses to whole is connected with public sewers.	State No. and kinds of noxious trades. (See sec. 63 Public Health Act.) How licensed and regulated?	Have there been any prosecutions during year under Public Health Act? State in detail the nature of the case, and results of same.
No; by householder.....	No	Gas works; storing hides.	None.
Removed by private parties.	No	None	None.
Sanitary inspector gives instructions to have all accumulations removed.	No	None except tanneries ..	No.
.....
No	No .....	.....	One summons issued, but withdrawn as party complied with request of Board of Health.
Always on complaint.....	No	None	None.
No	Yes; some stone sewers; about 35 water closets connected with drains, or about one closet to every 40 houses.	.....	None.
Yes; so much a bbl	Yes, in course of construction.	None	No.
We have an orderless excavator; charges are made per bbl. and paid by parties securing his services.	No	Slaughterhouses by special permit of B. of Health.	No.
Yes	No	No	None.
No	No	No	No.
Yes; 25c. per bbl	No	None	No.
No	Partial	Six; boiling offal; storing hides; tallow melting; tripe boiling; slaughtering of animals; manufacture of gas.	Not this year.

TOWNS.—*Continued.*

Name of Municipality.	Names of Medical Health Officer and Sanitary Inspector.	Is there general sanitary inspection? Is it repeated at intervals every year? or is action taken only when complaint of nuisance is made to Board.	Contagious diseases.
Penetanguishene	Geo. Bowman, M.D.; R.J. Parker, S. I.	Yes; general inspection every spring.	Scarlatina, 3 cases; typhoid, 6..
Fort William...	W. H. Hamilton, M.D.; Jas. Tonkin, S. I.	No periodical inspection: only when occasion require.	Scarlatina, 5 cases; diphtheria, 7 cases, 2 deaths.
Paris	D. Dunton, M.D.; Thomas Cameron, S. I.	Yes; general inspection in May each year.	Scarlatina, 1 case; diphtheria, 6 cases, deaths 3; typhoid, 2 cases.
Palmerston.....	John Greenlaw, M.D.; John Westport, S. I.	General inspection once a year.	Scarlatina, 1 case; diphtheria, a few cases; typhoid, several cases.
Pembroke	W. W. Dickson, M.D.; John Campbell, S. I.	Inspection made on complaint of nuisance.	Diphtheria, 6 cases; typhoid, 33 cases. 5 deaths.
Perth*.....	No M. H. O.; John Keys, S. I.	.....	.....
Peterboro'	John Clark, M.D. ....	.....	Typhoid fever, 67 cases, 6 deaths; scarlet fever, 26 cases, 2 deaths.
Petrolia	A. R. Sturgeon, M.D.; John Ferguson, S. I.	Yes,	Diphtheria, 12 cases, 3 deaths; typhoid, 6 cases, no deaths.
Prescott.....	W. P. Buckley, M.D.	Yes	Diphtheria, 7 cases, 1 death.....
Preston	W. D. Duck, M.D.; Chas. J. Ross, S. I.	Yes; no.	Diphtheria, 2 cases; typhoid, 2 cases.
Picton	H. B. Evans, M.D. ....	.....	4 cases typhoid, 1 death; 1 case diphtheria.
Port Arthur ...	G. S. Beck, M.D.; Rich'd. Nichols, S. I.	Yes; yes	Scarlatina, 1 case.
Port Hope	L. B. Powers, M.D.; J. Douglas, S. I.	Yes	Scarlatina, 1 case, 1 death; diphtheria, 1 case, 1 death; typhoid, 12 cases, 3 deaths.

TOWNS — *Continued.*

Is isolation of contagious diseases systematically carried out? State methods adopted and whether any isolation hospital exists.	Is diphtheria anti-toxine in common use by physicians? Give results of treatment in all cases where possible.	Is disinfection after contagious diseases carried out under the personal supervision of an officer of the Board?	Does the Board make systematic inspection of the public schools? Does it require a certificate of vaccination from new school children each year?
No	No	Yes	Yes
Due precaution taken.....	Not in general use	By sanitary inspector, under direction of M. H. O.	No
Only under direction of attending physician; no hospital; disinfection used and patient isolated.	No; has been used in four cases; two died, two recovered.	No.....	Yes; yes, it required vaccination of each pupil.
Not well	Don't know	No.....	No.....
Confining patient in room; excluding all persons not engaged in nursing.	Yes; results have been almost uniformly successful.	No; medical men required to give certificates of disinfection.	M. H. O. inspects schools; no.
.....	.....	.....	No.....
Yes .....	.....	.....	.....
Yes, by placarding infected houses; no.	Yes; results were very satisfactory.	Yes	Yes; yes
No; yes	No.....	Yes	No; no.....
Not necessary	Yes	Yes	Yes
.....
Yes	Yes; treatment very satisfactory.	Yes	Yes
Yes	No occasion to use it....	Yes	Yes

TOWNS.—Continued.

Name of Municipality.	Are forms for notification by teachers and M. H. O. of contagious diseases supplied? If not, will you explain the reason?	Give the source of water supply used on the premises. Also cause of typhoid fever cases.	Is there systematic inspection of dairy cows made during the year. Have cases of tuberculosis occurred, and state whether the tuberculin test has been used.	How many slaughter houses in municipality? Are they licensed on evidence of being kept in good sanitary condition? How is offal disposed of? Is there systematic inspection of carcasses by any officer of the Board.
Penetanguishene	Yes	Waterworks system	No	Two; no; no.
Fort William...	M. H. O. supplied.	River water and wells...	Inspection of dairies each year.	Three; not strictly enforced; ordinary manner; no.
Paris	Yes; yes	Schools use the public supply of water; cannot give cause of typhoid.	One general inspection is made; none; no.	No.
Palmerston	Don't know	Wells	No.	Two; no license; offal said to be boiled and fed to hogs; no inspection.
Pembroke	Yes	Supply of water mostly taken from water system; some wells.	No; no cases of tuberculosis; no test.	One, on condition of being kept in sanitary condition; offal boiled and fed to hogs; no inspection of carcasses
Perth . . . . .	. . . . .	Wells; no typhoid fever cases.	Don't know	Two; sanitary inspector inspects them.
Peterboro' . . . . .	. . . . .	Wells and waterworks system.	. . . . .	. . . . .
Petrolia	Yes	Wells	Yes; no	None.
Prescott	No. . . . .	. . . . .	No; no.	None; no inspection.
Preston	No.	Wells and springs; very little typhoid.	No; no . . . . .	. . . . .
Pictou . . . . .	. . . . .	. . . . .	. . . . .	. . . . .
Port Arthur...	Yes . . . . .	. . . . .	No; one case; no tuberculin test.	Two; not licensed
Port Hope	Yes	Wells and waterworks from lake.	None	None.

TOWNS.—Continued.

Is there systematic removal of garbage, and night soil? If so on what basis of cost is the removal made. How is cost calculated?	Is there a public sewerage system? If so what proportion of houses to whole is connected with public sewers.	State No. and kind of noxious trades. (See sec. 63 Public Health Act.) How licensed and regulated?	Have there been any prosecutions during year under Public Health Act? State in detail the nature of the case, and results of same.
Yes	Yes	None	No.
Yes	No	Only in connection with butchering business.	No.
Night soil removed under contract; cost \$3 for pits two cubic yds. and under, over that \$1.50 per cubic yard.	No.	None	None.
.....	No.	None	One butcher fined for killing on his premises instead of at his slaughter-house.
Garbage and night soil removed by private individuals under instructions of Board of Health.	No.	None	None.
Removal of night soil by individuals who do this business; one charges 50c. a bbl., another by lump sum.	No.	No.	No.
.....
Yes; 50c. per bbl. for night soil.	Yes; 10 per cent	None	No.
Night soil and garbage removed by contract.	No.	None	One for diseased meat.
No.	No. ....	.....	.....
.....
Yes	No.	No.	No.
Yes	No.	None	No.

TOWNS.—Continued.

Name of Municipality.	Names of Medical Health Officer and Sanitary Inspector.	Is there general sanitary inspection? Is it repeated at intervals every year? or is action taken only when complaint of nuisance is made to Board.	Contagious diseases.
Rat Portage ..	S. S. Scovil, M.D.; R. B. Dorken, S. I.	Yes	Diphtheria, 1 case; typhoid, 6 cases.
Renfrew	N. McCormack, M.D.; B. J. McDeimott, S. I.	Yes; yes.	Scarlatina, 1; Diphtheria, 1
Ridgetown	F. B. Marr, M.D.; John B. Grant, S. I.	Generally on complaint to Board.	Typhoid, 2 cases.....
Sandwich	R. H. Casgrain, M.D. ...	General inspection	Diphtheria, 10 cases, 2 deaths; typhoid, 1 case.
Sarnia	No M. H. O.; appointed by council when necessary. E. Oliver, M.D., acts for the Board; H. O'Reilly, S. I.	General inspection..	Diphtheria, 15 cases, deaths, 2...
Sault Ste. Marie	No M. H. O.; John L. Rae, S. I.	General inspection in spring; sometimes on complaint.	Scarlatina, 3 cases; typhoid, 73 cases, 2 deaths; a number of these cases from lumber camp.
Simcoe.	J. C. C. Grasette, M.D.; Geo. Coats, S. I.	General inspection in spring and on complaint, if any.	Diphtheria, 6 cases, 1 death; typhoid, 3 cases, 1 death.
Strathroy	G. Henderson, M.D.; R. Miller, S. I.	Yes	None.....
Smith's Falls...	C. R. Easton, M.D.; R. J. McGowan, S. I.	Yes; yes.	Typhoid, 3 cases
Thorold	James K. Johnston, M.D.; Geo. Upper, S. I.	Yes	
Trenton	J. A. Stevenson, M.D.; Thos. H. Coleman, S. I.	General inspection twice a year.	Scarlatina, 5 cases; diphtheria, 10 cases, 3 deaths; typhoid, 4 cases.

TOWNS.—Continued.

Is isolation of contagious diseases systematically carried out? State methods adopted and whether any isolation hospital exists.	Is diphtheria anti-toxine in common use by physicians? Give result of treatment in all cases where possible.	Is disinfection after contagious diseases carried out under the personal supervision of an officer of the Board?	Does the Board make systematic inspection of the public schools? Does it require a certificate of vaccination from new school children each year?
No hospital; patients are put into a canvas tent in isolated part of town.	When used proved successful.	Yes, by attending physician.	No; no
Yes	No	Yes	Yes
House placarded and disinfected by M. H. O. and sanitary inspector.	Cannot say	Supposed to be under M. H. O.	No
Yes; houses placarded and disinfected.	Yes, and with excellent results; the 2 deaths were the result of not calling on medical aid in time.	Yes	So far as may be necessary.
Yes, by placarding residence. The Board has a building to use as an isolation hospital.	It is used occasionally; results generally successful.	No	No; the School Board requires certificates.
No; no hospital	None required	No	No; not necessary
No hospital; prompt measures taken to isolate when necessary.	Diphtheria anti-toxine is generally used by the profession and with good results.	Yes	Board accepts verbal report of teachers.
Yes, when necessary	M. H. O. has a supply on hand; none required up to present time.	Yes, when necessary	No; yes
Yes, by placarding	No	Yes	No; No
None to isolate		None to disinfect	The sanitary inspector has done so.
Yes	No	Yes; by sanitary inspector.	Yes; by sanitary inspector.

TOWNS.—Continued.

Name of Municipality.	Are forms for notification by teachers and M. H. O. of contagious diseases, supplied? If not, will you explain the reason?	Give the source of water supply used on the premises. Also cause of typhoid fever cases.	Is there systematic inspection of dairy cows made during the year. Have cases of tuberculosis occurred, and state whether the tuberculin test has been used.	How many slaughterhouses in municipality? Are they licensed on evidence of being kept in good sanitary condition? How is offal disposed of? Is there systematic inspection of carcasses by any officer of the Board.
Rat Portage....	Yes	Lake water	Inspection made in February; milk tested; no tuberculin test.	Three; not, licensed; are kept in sanitary condition; offal fed to hogs; a weekly inspection made.
Renfrew	Yes	Wells	No; no	None
Ridgetown	Cannot say....	Wells	No.....	None
Sandwich	No.....	From Windsor and wells.	No.....	None
Sarnia	Forms used by medical practitioner.	No cases reported	No; milk vendors are licensed by council, and the Board has power to inspect dairies when necessary.	None.....
Sault Ste. Marie	None furnished the Board of Health.	City water used at public schools instead of wells; difficult to tell, most probably from river water.	No; none reported; no.	Two; none licensed; burnt; Board inspects slaughterhouses.
Simcoe	Furnished to M. H.O. and physicians only.	Wells; good water ...	No; no license for selling milk; no cases of tuberculosis.	Two; no licenses, but kept in good sanitary condition.
Strathroy	Yes	Wells	Yes; no; no	Two; not licensed; under direction of sanitary inspector; no.
Smith's Falls...	Don't know ...	Wells	No; don't know....	None.....
Thorold	Yes	Wells	None in town.....	None.....
Trenton	Yes	Wells and springs and waterworks.	Dairy cows inspected; no disease found.	None.....

TOWNS.—Continued.

Is there systematic removal of garbage, and night soil? If so on what basis of cost is the removal made. How is cost calculated?	Is there a public sewerage system? If so what proportion of houses to whole is connected with public sewers.	State No. and kind of noxious trades. (See sec. 63 Public Health Act.) How licensed and regulated?	Have there been any prosecutions during year under Public Health Act? State in detail the nature of the case, and results of same.
Council appoints a scavenger, who charges for amount of work done; scavenger pays \$10 for license.	No.....	Slaughtering animals; tallow melting; hides, store houses.	One prosecution under Health Act for refusing to clean privy pit when notified; penalty and costs collected.
Yes; 20c per month per closet by corporation contract (dry earth system.)	No.....	No.....	No.
By scavenger appointed by council.	No.....	None	No.
Night soil buried; garbage usually burnt.	Partial	None	No.
Garbage removed by rate-payers to the satisfaction of inspector; night soil removed by contract.	Yes; about 25 per cent..	None	No.
No.....	No.....	None	Yes; one butcher fined for not keeping slaughterhouse in sanitary condition; one vegetable grower for not cleaning up yard; settled out of court.
Yes	Two sewers running into river Lyon; about one-fifth of the houses use them.	None	No.
Yes; by contract with corporation on basis of number of persons who use the privy.	Yes	1 tannery; 2 slaughter-houses.	No.
No, of garbage; yes, of night soil; paid by individuals.	No.....	None	No.
Yes	No.....	None	No.
Yes	No.....	Storage of hides	No.

TOWNS.—*Concluded.*

Name of Municipality.	Names of Medical Health Officer and Sanitary Inspector.	Is there general sanitary inspection? Is it repeated at intervals every year? or is action taken only when complaint of nuisance is made to Board.	Contagious diseases.
Toronto Junct'n.	Henry W. Leitch, M.D.; J. R. Rogers, S. I.	Yes; yes	Scarlatina, 4 cases; diphtheria, 9 cases; typhoid, 7 cases.
Uxbridge	H. Bascom, M.D.; Wm. Tuck, S. I.	Yes, once a year; sometimes twice.	Typhoid, 15 cases.
Wallaceburg....	Geo. Mitchell, M.D.; John Gronyou, S. I.	House to house inspection.	None
Walkerton	G. J. Dickison, M.D.; G. McKay, S. I.	Yes; yes	Diphtheria, 7 cases, 1 death; typhoid, 15 cases.
Walkerville	C. W. Hoare, M.D.; C. B. Griffith, S. I.	Yes; and repeated at intervals.	Scarlatina, 4; diphtheria, 7; typhoid, 5.
Waterloo	C. T. Neocker, M.D.	Yes	Scarlatina, 17; typhoid, 12; diphtheria, 3 cases, 1 death.
Whitby	Dr. Bogart; Wm. Calverley, S. I.	When complaint is made..	Scarlatina, 1 case; diphtheria, 4 cases.
Wingham	W. B. Towler, M.D.; Van Norman, S. I.	.....	Typhoid, 1 case, 1 death
Warton.....	H. Waigle, M.D.; H. W. Hull, S. I.	Yes	Diphtheria, 30 cases
Woodstock	A. McLav, M.D.; — Baldwin, S. I.	.....	Typhoid fever was prevalent; scarlet fever and diphtheria has been almost unknown; 1 death from former took place.

TOWNS—*Concluded.*

Is isolation of contagious diseases systematically carried out? State methods adopted and whether any isolation hospital exists.	Is diphtheria anti-toxine in common use by physicians? Give results of treatment in all cases where possible.	Is disinfection after contagious diseases carried out under the personal supervision of officer of the Board?	Does the Board make systematic inspection of the public schools? Does it require a certificate of vaccination from new school children each year?
Yes; use Toronto isolated hospital.	Yes; recovery when used; both with and without.	Yes.	No; no.
Yes; room isolated; no hospital.	No diphtheria for three years.	No.	Yes; no.
None; no hospital.	Yes ...	Not required.	
Yes; no hospital.	Don't know of its having been used in this town.	Yes.	No; no.
Yes; houses placarded and inmates quarantined as far as possible; no hospital.	Used in some cases; can't give results.	Yes.	Yes.
.....			
No; under medical attendant; no.	No.	No.	No.
By placarding houses and appointing nurses under M. H. O's. supervision.	No cases.	Yes.	No; no.
Yes.	No.	Yes.	Yes; no.
.....			

TOWNS.—*Concluded.*

Name of Municipality.	Are forms for notification by teachers and M.H.O. of contagion's diseases, supplied? If not, will you explain the reason?	Give the source of water supply used on the premises. Also cause of typhoid fever cases.	Is there systematic inspection of dairy cows made during the year. Have cases of tuberculosis occurred, and state whether the tuberculin test has been used.	How many slaughterhouses in municipality? Are they licensed on evidence of being kept in good sanitary condition? How is offal disposed of? Is there systematic inspection of carcasses by any officer of the Board.
Toronto Junc'n.	No.....	Lake Ontario and wells; no specific cause of typhoid.	No; no; milk tested; none.	None
Uxbridge	Yes	Wells; fever can almost invariably be traced to impure water.	No; no	One
Wallaceburg ...	None.....	Wells .....	.....	None
Walkerton	Yes	Waterworks supply the greater part of the town, wells the rest; cannot say cause of typhoid.	No; not that I know of; no tuberculin test.	Four; yes, offal is boiled and fed to hogs; no inspection of carcasses officially.
Walkerville ...	No; M.H.O. is in close touch with teachers and schools.	Detroit river; one case imported, other four due to contagion conveyed in milk.	No.....	One; not licensed; offal is used for fertilizing purposes.
Waterloo .....	.....	.....	.....	.....
Whitby	Yes	Wells; not known.	No dairy in town ...	Three; no; manure, etc; no.
Wingham	Don't know ...	Wells; contracted from home.	None; no.....	None; no
Warton	No.....	Colpoy's Bay and some wells.	No; no.....	None.....
Woodstock .....	.....	Typhoid fever has been more prevalent during past year, doubtless due in a large measure to polluted wells and cisterns.	.....	.....

TOWNS.—*Concluded.*

Is there systematic removal of garbage, and night soil? If so on what basis of cost is the removal made. How is cost calculated?	Is there a public sewerage system? If so what proportion of houses to whole is connected with public sewers.	State No. and kind of noxious trades. (See sec. 63 Public Health Act.) How licensed and regulated?	Have there been any prosecutions during year under Public Health Act? State in detail the nature of the case, and results of same.
Yes; night soil by contract, \$14.00 per annum; cess-pools, 20c. per bbl.	Yes; about $\frac{1}{4}$	Sausage casing works; has permit from P. B. H., provided it is not a nuisance to locality.	No.
No.....	No.....	None	No.
By contract .....	.....	None .....	.....
By private parties; no contract by town.	Yes	None	Yes; feeding uncooked offal to hogs; fined \$5 and costs.
Yes; no estimate of cost made.	Yes; nearly all houses connected.	None	No.
.....	.....	None .....	.....
None	No.....	None	Only as to cleaning up in spring time.
None	None	None	No.
Scavenger attends to removal.	No.....	None	No.
.....

VILLAGES.

Name of Municipality.	Names of Medical Health Officer and Sanitary Inspector.	Is there general sanitary inspection? Is it repeated at intervals every year? or is action taken only when complaint of nuisance is made to Board.	Contagious diseases.
Alliston	J. J. Harper, M.D.; G. McGuinnis, S. I.	Yes; twice thoroughly....	Diphtheria, 1; typhoid, 2.
Alvinston ...	A. McKinnon, M.D.; A. J. Trolly, S. I.	Yes; yes.....	Typhoid, 2 cases.....
Alexandria ...	D. D. McDonald, M.D.; A. P. McDonald, S. I.	Yes; repeated. The sanitary inspector visits all premises whether complaint is made or not.	Diphtheria, 22 cases, 7 deaths; typhoid, 5 cases.
Ailsa Craig.....	John Gunn, M.D.; Jas. Maguire, S. I.	Yes, annually; special inspection on complaint.	None reported.....
Allandale	None; G. Whitley, S. I..	Twice a year	Diphtheria, 1 case
Bayfield.....	C. Sheppard, M.D.; John Biggant, S. I.	Inspection once a year, and when complaint is made.	Typhoid, 5 cases, 1 death.....
Bath	H. S. Northmore, M.D.; F. Whiskins, S. I.	Yes; yes.....	Typhoid, 3 cases.....
Belle River.....	N. J. Amyot, M.D.....	.....	Scarlatina, 2 cases; typhoid, 8 cases, 1 death.
Beamsville	C. N. D. Fairfield, M.D..	House to house visits by sanitary inspector.	None
Beaverton	A. Grant, M.D.; W. Brian, S. I.	Yes, twice a year	Diphtheria, 6 cases; typhoid 1 ..
Brighton	W. B. H. Dean, M.D.....	.....	Typhoid, 2 cases, 1 death.....
Brussels.....	J. A. McNaughton, M.D.; John Wright, S. I.	General inspection as required by the Board of Health.	Typhoid, 7 cases.....

VILLAGES.—*Continued.*

Is isolation of contagious diseases systematically carried out? State methods adopted and whether any isolation hospital exists.	Is Diphtheria anti-toxine in common use by physicians? Give results of treatment in all cases where possible.	Is disinfection after contagious diseases carried out under the personal supervision of an officer of the Board?	Does the Board make systematic inspection of the public schools? Does it require a certificate of vaccination from new school children each year?
Yes; patient is isolated, house placarded.	Yes; only one case so treated recovered.	Not generally so.....	Yes; no
No; house placarded .....	.....	No	Yes; no
Yes; houses placarded; M. H. O. visits patient and gives directions; rules laid down by P. B. of H. strictly carried out.	No; it has been occasionally, other remedies were used at same time.	Yes; disinfection is carried out under the direct supervision of M. H. O.; house fumigated with burnt sulphur, etc.	Yes; no
No; physicians fail to report whooping cough, typhoid and measles.	No diphtheria cases for some years.	No	No; no
.....
Yes	No cases	No	No; no
Yes; no isolation hospital; isolation from school and general disinfection.	No	No	No; no
No.....	Would be if necessary ..	No	No
Having no contagious diseases no methods were required.	.....	.....	No
Yes, as far as possible; no isolation hospital.	No	Yes	No
Yes, as well as possible; no isolation hospital.	No	Under supervision of M. H. O.	Only M. H. O. inspects officially.
Placards; disinfection.....	No	Not altogether; some cases not reported by physician.	Yes; no

VILLAGES.—*Continued.*

Name of Municipality.	Are forms for notification by teachers and M. H. O. of contagious diseases supplied? If not, will you explain the reason?	Give the source of water supply used on the premises. Also cause of typhoid fever cases	Is there systematic inspection of dairy cows made during the year. Have cases of tuberculosis occurred, and state whether the tuberculin test has been used.	How many slaughter houses in municipality? Are they licensed on evidence of being kept in good sanitary condition? How is offal disposed of? Is there systematic inspection of carcasses by any officer of the Board?
Alliston	No; not deemed necessary to have special forms.	Wells; good sandy sub-soil; typhoid cases imported from Everett, and traced from there to Collingwood.	No; no	Two; yes; blood is fed to swine, dirty fluid drained into river.
Alvinston	No	Good well water.....	No; no	One; no; no.....
Alexandria	No; municipality being so small no trouble getting verbal reports.	Wells; clay and lime stone, and water from waterworks; one case traced to bad water-closet.	No	One, but not in use at present; offal fed to pigs.
Ailsa Craig.....	Yes	Wells	No; no	None
Allandale				One; yes; yes
Bayfield.....	No	Wells	No; no	One; no
Bath	No; don't know.	From Bay Quinte; stagnant water from obstructed drain.	No	One; flushed away from dwelling or roadway.
Belle River.....		Surface wells	No; no	One; no; fed to hogs; no.
Beamsville.....	Yes	Wells	No	None permitted.....
Beaverton	None	Wells; one case imported.	No; no; no dairy cows kept in municipality.	None
Brighton	No	Wells and cisterns; first case imported, second case contracted from first.	No	Two; not licensed; no.
Brussels.....	Yes	Wells	Yes; no	None

VILLAGES.—*Continued.*

Is there systematic removal of garbage and night soil? If so, on what basis of cost is the removal made? How is the cost calculated?	Is there a public sewerage system? If so, what proportion of houses to whole is connected with public sewers.	State No. and kinds of noxious trades. (See sec. 63 Public Health Act.) How licensed and regulated?	Have there been any prosecutions during year under Public Health Act? State in detail the nature of the case, and results of same.
No	Not in general, on main street only.	Two tanneries; regularly inspected.	No.
Yes; sanitary inspector sees that all closets are clean; proprietor pays cost.	No.....	None	No.
Oderless system of removal; scavengers remove to dumping ground outside the corporation; scavengers paid by householders and act under the direction of Board of Health, and are paid from 25 to 50 cents per barrel.	No.....	Two tanneries; are inspected from time to time.	Two prosecutions; one taken against a physician from removing cards from door where two cases of diphtheria existed, was fined \$5 and costs; the other charge was withdrawn.
Yes; annually in April; by contract and special rate of 50 cents per water-closet levied to defray cost of removal.	No.....	None	None.
.....	.....	None.....	None.
No.....	No.....	None.....	No.
Yes; removed under supervision of sanitary inspector by tenant or occupant.	No.....	None.....	No.
No.....	None	None.....	None.
No.....	No.....	None.....	None.
Yes; householders remove at their own expense.	No.....	None.....	No.
No.....	No.....	None.....	None.
Partly; owner pays cost of removal according to depth of pit.	No, main street only....	None.....	No.

VILLAGES.—*Continued.*

Name of Municipality.	Names of Medical Health Officer and Sanitary Inspector.	Is there general sanitary inspection? Is it repeated at intervals every year? or is action taken only when complaint of nuisance is made to Board.	Contagious diseases.
Bolton	L. R. Stewart, M.D.; S. Walford, S. I.	At intervals and when complaint is made.	None
Burk's Falls....	W. Crawford, M.D.; W. A. Kelsey, S. I.	General inspection is made each spring, and when complaint is made.	Scarlatina, 3 cases; Diphtheria, 4 cases, 1 death, typhoid, 1 case.
Beeton	Dr. Law; D. W. Watson, S. I.	A number of minor cases were reported and carefully looked into.	None
Burlington	A. H. Spears, M.D.; J. Anderson, S. I.	General inspection May 1st, and afterwards if complaint is made.	Typhoid, 16 cases.....
Bridgeburg.....	C. M. Sheepe, M.D.; G. N. Bemier, S. I.	Yes; it is only repeated when complaint is made.	None
Blythe	D. D. Carder, M.D.; James Davis, S. I.	Yes.....	Scarlatina, 4; Diphtheria, 3, 1 death; typhoid, 3.
Cardinal	Drs. Gow and Blakely ...	Once a year the inspector makes his rounds, and when complaint is made.	None
Casselman .....	.....	Inspection is made from time to time.	Scarlatina, 20; diphtheria, 5; 2 deaths.
Chesterville ...	None; H. W. Moad, S. I.	Yes, and repeated at intervals.	None
Chippawa	R. A. Darragh, M.D.	When complaint is made to Board.	None
Clifford	Dr. Ross; Robt. Steele, S.I.	Premises inspected twice a year, and oftener if necessary.	No
Colborne.	W. A. Willoughby, M.D.; E. W. Suttle, S. I.	General inspection, and in all cases of complaint.	Typhoid, 2; 1 death

VILLAGES.—Continued.

Is isolation of contagious diseases systematically carried out? State methods adopted and whether any isolation hospital exists.	Is Diphtheria anti-toxine in common use by physicians? Give results of treatment in all cases where possible.	Is disinfection after contagious diseases carried out under the personal supervision of an officer of the Board?	Does the Board make systematic inspection of the public schools? Does it require a certificate of vaccination from new school children each year?
Yes, when necessary; no isolation hospital.	No	No; only by the attending physician.	No; no.....
Yes, isolate the house.....	Yes; result so far very good.	Yes	No
.....	Anti-toxine has been supplied for M. H. O. to be used when required.	.....	The public school was carefully inspected.
No isolation hospital; houses are placarded.	Has been used once; M. H. O. contracted diphtheria and used anti-toxine with good results.	No	Schools inspected once a year, and oftener if required.
Yes; placard houses and close schools.	Don't know	No; no contagious diseases.	No
Yes, by fumigation and disinfecting.	No	Yes	Yes; no
.....	No.	No.	No.....
Isolated in the houses.....	.....	Yes	No.....
Always has been; no hospital.	No cases.	Not required.....	No; no
No cases this year	No cases.....	Would be if required....	No.....
No hospital; physicians use precaution and isolate cases, Where danger of infection exists.	Cannot say; no cases of diphtheria having been reported.	Is left in the hands of attending physician.	No; no
Yes; by placarding, and inmates kept under surveillance; no hospital.	No.....	Yes; M. H. O.....	No.....

VILLAGES.—*Continued.*

Name of Municipality.	Are forms for notification by teachers and M. H. O. of contagious diseases, supplied? If not, will you explain the reason?	Give the source of water supply used on the premises. Also cause of typhoid fever cases.	Is there systematic inspection of dairy cows made during the year. Have cases of tuberculosis occurred, and state whether the tuberculin test has been used.	How many slaughter houses in municipality? Are they licensed on evidence of being kept in good sanitary condition? How is offal disposed of? Is there systematic inspection of carcasses by any officer of the Board.
Bolton	Only to M. H. O.; not sufficient forms to supply teachers.	Wells ..	Only one dairy; no inspection.	Four permitted on being kept in sanitary condition; offal is cooked before being fed to hogs, or buried; no inspection of carcasses.
Burk's Falls....	Yes	Wells; typhoid case contracted from outside.	No	None
Beeton	No	From wells.....	.....	One; licensed; no inspection.
Burlington	No	Wells; not traceable ...	No	None
Bridgeburg.....	Don't know of any being supplied.	From wells, apparently fed from Lake Erie.	No	None
Blythe	No	Wells; cannot determine the cause.	No; no.....	None
Cardinal.	Never heard of any being used.	Wells generally; water-works put in last year, and some families supplied from St. Lawrence river.	No	None
Casselman....	Yes	Wells and river water...	No ..	Two; offal is burned ...
Chesterville ...	No	Wells	No; no	One; not licensed but kept in good sanitary condition; no inspection of carcasses.
Chippawa	None supplied..	Wells	No	One; licensed; offal disposed of in usual way.
Clifford	Yes; but Drs. only use them.	Wells; no cases of typhoid.	No; no cases of tuberculosis in village, but a few cases reported in the immediate vicinity.	Two; not licensed but kept in good condition; no inspection of carcasses.
Colborne	No; not deemed necessary.	Wells and springs; outside causes.	No; no	None

VILLAGES — *Continued.*

Is there systematic removal of garbage, and night soil? If so on what basis of cost is the removal made. How is cost calculated?	Is there a public sewerage system? If so what proportion of houses to whole is connected with public sewers.	State No. and kind of noxious trades. (See sec 63 Public Health Act.) How licensed and regulated?	Have there been any prosecutions during year under Public Health Act? State in detail the nature of the case, and results of same.
Night soil taken away by farmers.	No public sewerage.....	None.....	None.
No.....	No.....	None.....	None.
No; council should see to it.	The sewerage system is bad, several complaints made.	.....	None.
Yes.....	No.....	None.....	No.
No.....	No.....	None.....	None.
No.....	No.....	None.....	None.
No.....	No.....	None.....	None.
No.....	No.....	None.....	No.
No; work of this kind is done by private parties regularly.	No.....	None.....	No.
Each householder cleans his privy pits once a year and night soil buried in pits.	No public sewerage system.	None.....	None.
No; it is removed by householders under direction of sanitary inspector.	No.....	None.....	No.
Yes; by owners of premises, prompted in most cases by sanitary inspector.	No.....	None.....	No.

VILLAGES.—Continued.

Name of Municipality.	Names of Medical Health Officer and Sanitary Inspector.	Is there general sanitary inspection? Is it repeated at intervals every year? or is action taken only when complaint of nuisance is made to Board.	Contagious diseases.
Creemore	A. S. Kirkland, M.D.; D. Turner, S. I.	Yes, twice	None
Delhi	R. B. Wells, M.D.	Action taken when complaint is made.	Diphtheria, 8 cases, 2 deaths
Dundalk	J. A. McWilliams, M.D. . . . .	. . . . .	None
Drayton	Robt. Lucy, M.D.	Yes	Diphtheria, 4; typhoid, 10.
Dunnville	N. Hopkins, M.D.; W. Hamilton, S. I.	General sanitary inspection.	None
Durham	James, Gun, M.D.; D. McDonald, S. I.	Yes	Diphtheria, 7, 3 deaths; about 75 to 80 cases of an acute throat affection.
East, Toronto . . .	G. N. Britton, M.D.	Action taken when complaint is made.	. . . . .
Eganville	James Reeves, M.D.; Francis Wilson, S. I.	Yes, twice during the year.	Scarlatina, 1; diphtheria, 1.
Elora	No M. H. O.; D. Geddes, S. I.	Yes, in spring	Scarlatina, 1; typhoid, 3
Elmira	N. Ulyot, M.D.; R. J. Hall, S. I.	Yes; yes	None
Embro	J. Ross, M.D.; G. C. McKay, S. I.	Yes; general inspection in May.	None
Erin	No M. H. O.; Jno. Felker, S. I.	General inspection on 15th May; also action on complaint.	None

VILLAGES.—*Continued.*

Is isolation of contagious diseases systematically carried out? State methods adopted and whether any isolation hospital exists.	Is Diphtheria anti-toxine in common use by physicians? Give results of treatment in all cases where possible.	Is disinfection after contagious diseases carried out under the personal supervision of an officer of the Board?	Does the Board make systematic inspection of the public schools? Does it require a certificate of vaccination from newschool children each year?
Yes; methods are those laid down by P. B. H.; no hospital.	Yes; in one case 1,000 units injected within 24 hours after first taken; extensive membrane on tonsils within 18 hours; 1,000 units more injected; pulse 140; temp. 102° within 4 after first injection; pulse normal and membrane entirely gone; no.	When possible; not in all cases.	Yes; no
Yes	None required; all cases light.	No; but is done by families under direction of attending physician.	No
As far as possible	No	Yes, when necessary	No
By placarding houses; no hospital.	No	Yes	No
Houses isolated		Yes	No; no
Yes; houses placarded and sanitary inspector placed in charge.	No	Yes	No; no
Yes; no hospital	No diphtheria	Under supervision of attending physician.	No; no
Yes; no hospital		Yes	Yes
Placarding and strict quarantine; no hospital.	No; no cases here	Yes	Yes; periodical vaccination compulsory on all pupils.
Yes; placarded and isolated.	No	Yes	Yes

VILLAGES.—*Continued.*

Name of Municipality.	Are forms for notifications by teachers and M. H. O. of contagious diseases supplied? If not, will you explain the reason?	Give the source of water supply used on the premises. Also cause of typhoid fever cases.	Is there systematic inspection of dairy cows made during the year. Have cases of tuberculosis occurred, and state whether the tuberculin test has been used.	How many slaughter houses in municipality? Are they licensed on evidence of being kept in good sanitary condition? How is offal disposed of? Is there systematic inspection of carcasses by any officer of the Board.
Creemore	Yes	Wells .....	.....	One; no; boiled and fed to hogs; inspected 4 times last summer.
Delhi	Don't know of any.	Wells and springs.....	No	Two; outside of limits.
Dundalk .....	.....	Wells .....	.....	.....
Drayton.....	None	Wells and springs	No; none; not used.	None.....
Dunnville	Yes	Wells and Grand river no typhoid this year	No	None.....
Durham.....	Yes	Wells generally	No; no	None.....
East Toronto...	No	Springs	No	None.....
Eganville	Yes	Wells	No; no	None allowed within village limits.
Elora	No forms supplied to physicians.	Wells; all three contracted outside of village.	No; no	Three; two not licensed; offal used as manure: no.
Elmira	Yes	Wells	No; none.....	One; yes; buried generally; yes.
Embro	Yes	Wells	No; no tuberculosis; suspected; no test made.	Two; licensed; offal fed to swine; no inspection of carcasses.
Erin	Yes .....	.....	No	Two

VILLAGES.—*Continued.*

Is there systematic removal of garbage, and night soil? If so on what basis of cost is the removal made. How is cost calculated?	Is there a public sewerage system? If so what proportion of houses to whole is connected with public sewers.	State No. and kind of noxious trades. (See sec. 63 Public Health Act.) How licensed and regulated?	Have there been any prosecutions during year under Public Health Act? State in detail the nature of the case, and results of same.
Private.	No.	One slaughterhouse. inspected regularly.	None.
.....	No. ....	.....	No.
.....
Not general; each family attends to it.	No.	None.	None.
No.	Partial system just started.	None.	No.
Householders are required to remove all garbage, etc. to disinfect waterclosets.	No.	None.	No.
Garbage removed by municipality; night soil at owners' cost.	No.	None.	No.
No.	No.	None.	No.
No; removal by owners and occupants at their own expense.	No.	None.	None.
No.	No.	One slaughterhouse.	No.
No.	No.	No.	None.
No.	No.	None.	No.

VILLAGES.—*Continued.*

Name of Municipality.	Names of Medical Health Officer and Sanitary Inspector.	Is there general sanitary inspection? Is it repeated at intervals every year? or is action taken only when complaint of nuisance is made to Board.	Contagious diseases.
Exeter	T. A. Amos, M.D.; James Cruct, S. I.	.....	Scarlatina, 4; typhoid, 3.....
Fenelon Falls..	A. Wilson, M.D.; S. S. Nelvison, S. I.	Yes; generally during spring months.	Scarlatina, a few cases not reported; diphtheria, 7 cases.
Fergus.....	W. H. Johnston, M.D.	General inspection.....	None
Fort Erie	Wm. Douglas, M.D.; David Church, S. I.	General inspection.....	Diphtheria, 5 cases; typhoid, 1 case.
Glencoe	John Walker, M.D.; John Kills, S. I.	General and repeated at intervals.	Typhoid, 4 cases.....
Holland Land'g	Dr. Howe; no sanitary inspector.	Action taken when complaint is made.	None
Huntsville	T. L. Howland, M.D.; W. J. Gledhill, S. I.	Yes; and at intervals	Diphtheria, 1; typhoid, 29.....
Hagersville	Robt. McDonald, M.D....	General sanitary inspection.	Typhoid, 1
Kingsville.....	S. D. White, M.D.; W. Wigle, S. I.	Once yearly; action taken when necessary.	None
Lakefield.....	Alexander Bell, M.D.; Wm. Doig, S. I.	Yes; twice a year, and all cases reported are investigated.	Scarlatina, 8 cases, 1 death; diphtheria, 8 cases; typhoid, 1 case, 1 death.
Madoc	Edward D. Harrison, M.D.; R. O. Riordan, S. I.	Yes; yes	Diphtheria, 20 cases.....
Markdale	A. Ego, M.D.; G. Noble, S. I.	Yes; general inspection, and special inspection on complaint.	Diphtheria, 7; typhoid, 1.....

VILLAGES.—*Continued.*

Is isolation of contagious diseases systematically carried out? State methods adopted and whether any isolation hospital exists.	Is diphtheria anti-toxine in common use by physicians? Give results of treatment in all cases where possible.	Is disinfection after contagious diseases carried out under the personal supervision of an officer of the Board?	Does the Board make systematic inspection of the public schools? Does it require a certificate of vaccination from new school children each year?
Yes; family isolation	Yes; successfully	No.....	No.....
In diphtheria cases only, which are quarantined; no hospital.	No.....	Yes	No.....
Yes .....	.....	No.....	No; no
Isolation as far as possible in private houses; no hospital.	Yes; results very satisfactory.	Yes	Yes
Houses placarded and quarantined.	Yes	No cases except typhoid.	No.....
Inspection carried out under M. H. O's. orders; no hospital.	.....	Yes	No
Yes; small isolated building.	No.....	Yes	No
Yes; houses placarded: no hospital.	No. ..	Yes	No; no
Yes; when any exists	No cases reported	Yes	Yes
Yes, in houses, or sent to hospital at Peterboro'.	No.....	Yes, by M. H. O	Yes; no
Isolated in their homes	Yes; results have been all that could be desired	Yes ..	No.....
Yes; placarding and strict isolation in private houses.	Yes; in worst cases; results satisfactory.	Yes	No; no

VILLAGES.—Continued.

Name of Municipality.	Are forms for notification by teachers and M. H. O. of contagious disease, supplied? If not, will you explain the reason?	Give the source of water supply used on the premises. Also cause of typhoid fever cases.	Is there systematic inspection of dairy cows made during the year. Have cases of tuberculosis occurred, and state whether the tuberculin test has been used.	How many slaughter houses in municipality? Are they licensed on evidence of being kept in good sanitary condition? How is offal disposed of? Is there systematic inspection of carcasses by any officer of the Board.
Exeter	Yes	Springs and wells.	No	None.....
Fenelon Falls ..	Yes; to M.H.O.	Wells and springs; no typhoid cases.	No dairy here; a small dairy out of town supplies some customers; no cases of tuberculosis; no inspection.	None; no inspection of carcasses.
Fergus	Forms for M. H. O. only.	Wells	No	Three
Fort Erie	Yes	Niagara river and wells; from bad drainage.	No	None.....
Glencoe	Yes	Wells; impure water...	No; no	None; no
Holland Land'ng	No	Wells and springs.....	No dairies; no inspection; no cases.	None.....
Huntsville	Yes	Wells	No	None.....
Hagersville	No; no forms..	Wells; supposed to come from water.	No inspection	None.....
Kingsville.....	Yes	Wells	No; no	None.....
Lakefield	Yes	Wells; the case of typhoid came from Rice lake.	No dairy in village..	None.....
Madoc	No	Wells	No; no	Two; no; buried or fed to hogs; no.
Markdale	Yes	Wells; could not determine cause of the single case.	No; no tuberculosis.	None; no inspection of carcasses.

VILLAGES.—*Continued.*

Is there systematic removal of garbage, and night soil? If so on what basis of cost is the removal made. How is the cost calculated?	Is there a public sewerage system? If so what proportion of houses to whole is connected with public sewers.	State No. and kinds of noxious trades, (See sec. 63 Public Health Act.) How licensed and regulated?	Have there been any prosecutions during year under Public Health Act? State in detail the nature of the case, and results of same.
No.....	Yes; three-quarters	None.....	No.
No; in spring when sanitary inspector gives notice of removal; should occupants fail to comply must pay cost of removal.	No.....	No.....	No.
Yes.....	No.....	None.....	No.
No.....	No.....	None.....	No.
Night soil regularly removed under direction of B. of Health.	Sewers on Main street : about 10 per cent.	None.....	No.
Removed by occupants and owners of premises.	None.....	None.....	None.
Yes, at personal cost.....	No.....	None.....	No.
No.....	No P. S. S.....	None.....	No.
No.....	No.....	None.....	No.
Yes; twice a year; each one removes their own.	No.....	None.....	One; for improper burial of dead horse; settled by the party doing it to the satisfaction of M. H. O. he paying costs.
Yes; parties are notified to remove garbage and night soil, and citizens bear cost individually.	No.....	None.....	No.
Night soil buried; each citizen required to remove garbage, otherwise Board removes at his expense.	No.....	None.....	No.

VILLAGES.—*Continued.*

Name of Municipality.	Names of Medical Health Officer and Sanitary Inspector.	Is there general sanitary inspection? Is it repeated at intervals every year? or is action taken only when complaint of nuisance is made to Board.	Contagious diseases.
Merrickville....	M. K. Church, M.D.; Robt. Peoples, S. I.	Only when complaint is made.	Diphtheria, 3; 1 death.....
Millbrook	H. Turner, M.D.; James Harding, S. I.	Yes; once every year....	None
Newcastle	John McNaughton, M.D..	General inspection in the spring.	Typhoid, 2 cases
Norwich	E. E. Harvey, M.D.; E. W. Glover, S. I.	All premises are inspected in May each year, and when complaint is made.	Scarlatina, 1; typhoid, 3
New Hamburg ..	John Marty, M.D.; Alex. Fraser, S. I.	Once every year	Scarlatina, 8 cases; diphtheria, cases; typhoid, 15 cases.
Oil Springs	No M. H. O.; D. P. Sisk, S. I.	Yes	Diphtheria, 2; typhoid, 4.....
Ottawa, East...	Geo. Baptie, M.D.	Inspection once a year, and when complaints are made.	Diphtheria, 5 cases.....
Omeme	John N. Thompson, M.D.	None, except on complaint.	None
Port Colborne..	None.....	When complaint is made..	Diphtheria, 2; typhoid, 1
Port Dalhousie..	John N. Considine, M.D..	Yes; two or three times a year.	None
Port Dover.....	None; Wm. Porritt, S. I. ....	.....	Typhoid, 1
Port Elgin	F. H. Wells, M.D.; Geo. Henry.	Yes; repeated at intervals.	Scarlatina, 2 cases, 1 death; diphtheria, 2 cases; typhoid, 14 cases, 2 deaths.
Port Perry	D. Archer, M.D.; R. McNight, S. I.	Yearly inspection, also when complaint is made.	Diphtheria, 2 cases.....
Port Stanley ...	L. J. Mothersell, M.D.; S. England, S. I.	.....	Typhoid, 1 case

VILLAGES.—*Continued.*

Is isolation of contagious diseases systematically carried out? State methods adopted and whether any isolation hospital exists.	Is diphtheria anti-toxine in common use by physicians? Give results of treatment in all cases where possible.	Is disinfection after contagious diseases carried out under the personal supervision of an officer of the Board?	Does the Board make systematic inspection of the public schools? Does it require a certificate of vaccination from new school children each year?
Yes	Not in all cases	Yes	No; no
.....	No	Yes	Yes; no
No	Don't know	Yes	Yes
Patients are isolated from other members of family as far as possible in their own homes.	None used	Only in diphtheria and scarlatina cases has the Board supervised disinfection of premises.	No; no
Yes	No	No	Yes; no
Yes; in cases of diphtheria quarantine enforced.	Don't know	Yes	Sanitary inspector looks after the schools
Yes; under supervision of health officer; no hospital; isolated at houses.	In fairly common use; results not known.	Yes	No
Yes	No	Yes	No
Placarded and inmates of houses not allowed to mingle with the public.	Used in one case; patient recovered.	No	No
Not required	Not necessary	Not any contagious diseases.	No
No; no	No	No	No
Yes; no hospital; placard houses and take general precautions.	None used	Disinfected by M.H.O.	Sanitary inspector inspects schools and wells.
Yes; no hospital	Has been used by some physicians with good results.	By physicians in attendance. 1 M 1 50	No; no
Under supervision of M.H.O.	No	Yes	No

VILLAGES.—*Continued.*

name of Municipality.	Are forms for notification by teachers and M. H. O. of contagious diseases supplied? If not, will you explain the reason?	Give the source of water supply used on the premises. Also cause of typhoid fever cases.	Is there systematic inspection of dairy cows made during the year? Have cases of tuberculosis occurred, and state whether the tuberculin test has been used?	How many slaughter houses in municipality? Are they licensed on evidence of being kept in good sanitary condition? How is offal disposed of? Is there systematic inspection of carcasses by any officer of the Board?
Merrickville....	None supplied..	Wells .....	.....	None.....
Millbrook	Yes	Wells	No	Two; not licensed.....
Newcastle	Cannot say	Wells .....	.....	One; offal buried
Norwich	Physicians are supplied.	Wells; cannot give cause of typhoid.	No; no	None no
New Hamburg ..	No	Wells	No; no	Two
Oil Springs	None to teachers	Wells and cisterns; typhoid caused by surface water in wells.	.....	Two; offal cooked and fed to hogs.
Ottawa, East...	No	Wells	No	Two; licensed on condition offal carted out to land.
Omeme	Only to M.H.O.	Wells	No	None.....
Port Colborne..	No	Wells; cannot give cause of typhoid case.	No	No
Port Dalhousie ..	Not required ...	Wells and water from lake.	No	One
Port Dover	No	Wells; cannot say cause of typhoid.	Yes; no	One; yes; yes; yes ..
Port Elgin	Yes	Wells	No inspection	None.....
Port Perry	M. H. O. and physicians supplied.	Wells	No dairy cows; no tuberculosis.	None.....
Port Stanley ...	No	Wells	No	One

VILLAGES.—Continued.

Is there systematic removal of garbage and night soil? If so on what basis of cost is the removal made? How is the cost calculated?	Is there a public sewerage system? If so what proportion of houses to whole is connected with public sewers.	State No. and kinds of noxious trades. (See sec. 63 Public Health Act.) How licensed and regulated?	Have there been any prosecutions during year under Public Health Act? State in detail the nature of the case and results of same.
.....	No.....	.....	None.
By occupants	No.....	None.....	No.
Removed by occupants or owners.	No.....	No.....	No.
Each householder is responsible for the removal of garbage and night soil.	No sewerage system....	None.....	None
No.....	No.....	None.....	No.
Yes, of night soil; done by contract at 50c. per bbl.	One for cellars and surface drainage.	.....	One butcher prosecuted for selling diseased meat, animal had cancer in the head; party found guilty and \$50 and costs imposed and the business closed.
No.....	No.....	None.....	.....
No.....	No.....	None.....	No.
No.....	No.....	None.....	None.
No.	A few.....	None.....	No.
No.....	No.....	None.....	No.
A scavenger employed by the year.	No.....	None.....	No.
No.....	No.....	None.....	No.
No	No.....	One slaughterhouse and two fisheries under control of L. B. of Health.	None.

VILLAGES.—*Continued.*

Name of Municipality.	Names of Medical Health Officer and Sanitary Inspector.	Is there general sanitary inspection? Is it repeated at intervals every year? or is action taken only when complaint of nuisance is made to Board?	Contagious diseases.
Point Edward..	A. N. Hayes, M.D.....	Action taken when complaints are made to Board.	Typhoid, 1 case, 1 death
Portsmouth	None	House to house inspection made in spring.	Diphtheria, 5 cases; typhoid, 2 cases, 2 deaths.
Richmond Hill.	No M. H. O.; James Brownlee, S. I.	When complaint is made..	Typhoid, 1 case
Rockland	W. D. Ferguson, M.D.; Joseph Trotter, S. I	Yes, twice a year.....	Scarlatina, 10 cases, 2 deaths; diphtheria, 12 cases, 4 deaths; Typhoid, 14 cases, 2 deaths.
Stirling	J. S. Sprague, M.D.; J. Green, S. I.	Yes; yes	Typhoid, 1 case.....
Shelburne	Thos. Norton, M.D.; Wm. Calbeck, S. I.	Two inspections yearly, and when complaint is made.	Diphtheria, 7 cases, 4 deaths; typhoid, 3 cases, 1 death.
Southampton...	Chas. J. Laird, M.D.; Fred. Wellar, S. I.	Action taken only when complaint is made.	Typhoid, 3 cases.....
Stayner	None; B. Cheeseman, S. I	Yes; yes	Diphtheria, 2 cases; typhoid, 5 cases.
Streetsville	No M. H. O.; Jas. H. Davidson, S. I.	Two inspections in the year.	Typhoid, 2 cases.....
Stouffville.....	J. A. Freel, M.D	Yes; yes	Typhoid, 2 cases.....
Springfield	R. W. Shaw, M.D.; H. McTaggar, S. I.	One general inspection in the year.	Typhoid, 1 case.....
Sundridge.....	A. Carmichael, M.D.; Thomas Hall, S. I.	Yes; yes.....	Typhoid, 1 case
Sutton	O. T. Noble, M.D.; W. T. Brooks, S. I.	Only when complaint is made.	Diphtheria, 1; typhoid, 1.....

VILLAGES.—*Continued.*

Is isolation of contagious diseases systematically carried out? State methods adopted and whether any isolation hospital exists?	Is diphtheria anti-toxine in common use by physicians? Give results of treatment in all cases where possible?	Is disinfection after contagious diseases carried out under the personal supervision of an officer of the Board?	Does the Board make systematic inspection of the public schools? Does it require a certificate of vaccination from new school children each year?
Dwelling placarded; no hospital.	No cases.....	Disinfection by M. H. O. when required.	Yes
Removal to city hospital, Kingston.	Yes; successfully; all cases recovered through anti-toxine treatment.	No.....	No; no
No.....		Yes	
Isolation carried out as far as possible; no hospital.	Yes; results are good ..	Yes	No ..
Yes	No.....	Yes	No; no
No hospital, but isolation is carefully carried out.	Not used	Yes	Yes; yes
No hospital; patients isolated in homes.			No; no
Placarding houses; children not allowed to attend school.	No.	No.....	No; no.
No hospital.....		Yes	Systematic inspection made.
By placarding houses		Yes	No
Yes	Has not been required ..	Yes	No
Yes; isolation in home of patient.	Yes	Yes	Yes; no
Yes; houses placarded and patients isolated.	None	Yes	No

VILLAGES.—Continued.

Name of Municipality	Are forms for notification for teachers and M. H. O. of contagious diseases supplied? If not, will you explain the reason?	Give the source of water supply used on the premises. Also cause of typhoid fever cases.	Is there systematic inspection of dairy cows made during the year? Have cases of tuberculosis occurred, and state whether the tuberculin test has been used?	How many slaughterhouses in municipality? Are they licensed on evidence of being kept in good sanitary condition? How is offal disposed of? Is there systematic inspection of carcasses by any officer of the Board?
Point Edward..	Yes	Wells	No inspection of dairy cows; no case reported.	None.....
Portsmouth	None	Wells and lake : unknown.	No ; none reported.	None ; no
Richmond Hill.				Two
Rockland	No	Ottawa river	None	Two outside of village ; no inspection.
Stirling	None	Wells	No ; no	None.....
Shelburne	Yes	Wells ; typhoid cases are supposed to have been imported.	No	None.....
Southampton ..		Wells ; 2 out of the 3 were imported cases ; third case caused by using a filthy pail to hold water ; the water was good.	No ; no	Two ; not licensed but kept clean ; no.
Stayner	No		No	None.....
Streetsville	Yes ; to M.H.O. and physicians only.	Wells	No	Two ; licensed on condition that they are kept in a sanitary condition , offal fed to hogs ; no systematic inspection of carcasses
Stouffville	Yes	Wells	None	Two
Springfield	No	Wells	No ; no	Two ; yes ; no
Sundridge.....	Yes	Spring water	No ; no ; no.....	One ; not licensed; offal buried.
Sutton	Yes	Wells	No	Two

VILLAGES.—*Continued.*

Is there systematic removal of garbage and night soil? If so on what basis of cost is the removal made? How is the cost calculated?	Is there a public sewerage system? If so what proportion of houses to whole is connected with public sewers?	State No. and kinds of noxious trades. (See sec. 63 Public Health Act.) How licensed and regulated?	Have there been any prosecutions during year under Public Health Act? State in detail the nature of the case, and results of same.
No systematic removal....	None.....	None.....	None.
Removal in spring at cost of landlord and occupant.	No.....	None.....	No.
No....	No.....		
No....	No.....	None.....	None.
No.....	No.....	None.....	No.
No; only in spring time..	No.....	None.....	None.
No.....	No.....		No.
No.....	No.....	None.....	No.
No; removal made by householder.	No.....	No.....	None.
No.....	No.....	None.....	
No.....	No.....	None.....	No.
No.....	No.....	None.....	No.
No.....	No.....	Two slaughterhouses....	No.

VILLAGES.—*Concluded.*

Name of Municipality.	Names of Medical Health Officer and Sanitary Inspector.	Is there general sanitary inspection? Is it repeated at intervals every year? or is action taken only when complaint of nuisance is made to Board?	Contagious diseases.
Tara.....	Thomas Wilson, M.D.; L. T. Briggs, S. I.	Yes: once a year, and when complaint is made.	Diphtheria, 1 case.....
Teeswater.....	John Gillies, M.D.; James Irwin, S. I.	Yes	None
Thedford.....	Dr. Chapman; Joseph Robinson, S. I.	.....	None
Thessalon.....	T. J. McCort, M.D.; Wm. Higgins, S. I.	General inspection yearly.	None
Tilbury.....	M. Sharp, M.D.; R. Camley, S. I.	.....	None
Tilsonburg.....	C. McDonald, M.D.; A. Daw, S. I.	Action taken when complaint is made.	None
Vienna.....	J. H. Hoover, M.D.....	Action taken when complaints are made.	Scarlatina, several cases; typhoid, 1 case.
Waterdown.....	D. A. McClenahan, M.D.; Wm. Harvey, S. I.	Action taken on complaint of nuisance.	Scarlatina, 3 cases; diphtheria, 3 cases; typhoid, 3 cases.
Waterford.....	A. H. Duncomb, M.D.; W. B. Goodwin, S. I.	Yearly inspection, and on complaint of nuisance.	Diphtheria, 1 case.....
Watford.....	J. A. McLeay, M.D.; A. Mathews, S. I.	Yes; yes.....	.....
Weston.....	W. J. Charlton, M.D.....	.....	None; except a few cases of whooping cough and an epidemic of measles.
Woodbridge.....	None	Yes; twice a year.....	None
Woodville.....	John Grant, M.D.; M. McMillan, S. I.	Not this year, except by inspector, or when complaint is made.	None

VILLAGES.—*Concluded.*

Is isolation of contagious diseases systematically carried out? State methods adopted and whether any isolation hospital exists.	Is diphtheria anti-toxine in common use by physicians? Give results of treatment in all cases where possible.	Is disinfection after contagious diseases carried out under the personal supervision of an officer of the Board?	Does the Board make systematic inspection of the public schools? Does it require a certificate of vaccination from new school children each year?
Yes	No	No	No ; no
Yes ; houses placarded	No	By M. H. O	No ; no
.....	No cases	Yes	Yes ; quarterly certificate of vaccination demanded.
Yes ; no hospital	No	Yes	No
None	No diphtheria	No cases	No ; no
.....	.....	.....	No
Yes ; proper disinfection	No occasion for its use ..	Yes	No ; no
Yes ; no hospital	Partially	No	No ; no
Houses placarded	No	No	No ; no
.....	Some physicians have used it with good results.	M. H. O. attends to it when diseases exist.	Yes ; no
.....
.....	Did not require any .....	.....	Yes ; yes
Yes, when necessary	Not required	Yes	No ; no

VILLAGES.—*Concluded.*

Name of Municipality.	Are forms for notification by teachers and M. H. O. of contagious diseases supplied? If not, will you explain the reason?	Give the source of water supply used on the premises. Also cases of typhoid fever cases.	Is there systematic inspection of dairy cows made during the year? Have cases of tuberculosis occurred, and state whether the tuberculin test has been used.	How many slaughter houses in municipality? Are they licensed on evidence of being kept in good sanitary condition? How is offal disposed of? Is there systematic inspection of carcasses by any officer of the Board?
Tara	No	Wells	No ; no	None.....
Teeswater.....	Yes	Wells	Yes ; no cases of tuberculosis.	None.....
Thedford	Yes	Wells	None	None.....
Thessalon	Yes	Waterworks; water taken from lake.	No ; no	Two ; no ; fed to hogs.
Tilbury	No	Wells	No ; no	None.....
Tilsonburg	Yes	Wells and springs	No	Three ; no
Vienna	No supply ; done in writing.	Wells	No ; no	Two; no; buried deeply; no.
Waterdown	No	Springs and wells.....	No ; no	None.....
Waterford.....	No	Wells and springs	No	None.....
Watford.....	Yes	Wells	No ; no	None.....
Weston .....	.....	.....	.....	.....
Woodbridge....	Yes	Wells	No dairies; no tuberculosis.	Two; by permission from council and to keep them in sanitary condition ; no inspection of carcasses.
Woodville.....	No .....	.....	No	No ; no

VILLAGES.—*Concluded.*

Is there systematic removal of garbage and night soil? If so on what basis of cost is the removal made? How is the cost calculated?	Is there a public sewerage system? If so what proportion of houses to whole is connected with public sewers.	State No. and kinds of noxious trades. (See sec. 63 Public Health Act.) How licensed and regulated.	Have there been any prosecutions during year under Public Health Act? State in detail the nature of the case, and results of same.
No.	No.	None.	No.
No systematic removal.	No.	None.	No.
Sanitary inspector attends to this.	No.	None.	No.
No.	No.	None.	No.
No.	No.	None.	No.
Yes; dry earth system; cost 20c. per month per closet.	No.	None.	No.
No.	No.	None.	No.
No.	No.	None.	No.
Yes.	No.	None.	No.
Yes; night soil is removed at 50c. per bbl. and garbage as agreed upon.	No.	None.	No.
.....
Night soil and garbage is buried.	No.	None.	No.
No.	No.	None.	No.

TOWNSHIPS.

Name of Municipality.	Names of Medical Health Officer and Sanitary Inspector.	Is there general sanitary inspection? Is it repeated at intervals every year? or is action taken only when complaint of nuisance is made to Board?	Contagious diseases.
Adelaide	T. J. Bateman, M.D.; Chas. Clifford, S.I.	No; no; yes	Typhoid, 5 cases, 1 death
Amabel	F. Campbell, M.D.; R. Murray, S.I.	Yes; yes; no	Diphtheria, 15 cases, 3 deaths ..
Anson and Hindon.	C. D. Curry, M.D.	When complaint is made..	Diphtheria, 2 cases
Athol			Scarlatina, 1 case, 1 death
Algona, S.	James Reeves, M.D.	When complaint is made..	Diphtheria, 1 case, 1 death
Alice and Fraser	G. E. Josephs, M.D.	When complaint is made to Board.	Diphtheria, 1 case
Arthur	A. J. Reynolds, M.D.		Typhoid, 4 cases.
Aldborough	S. M. Dorland, M.D.	Yes; yes.	Scarlatina, 8 cases, no deaths; diphtheria, 4 cases, 2 deaths; typhoid, 1 case, 1 death.
Ameliasburg	A. J. File, M.D.; T. H. Thornton, M.D.; T. H. Farncomb, M.D.; R. B. Hubbs, S.I.	Yes; every year	Diphtheria, 8 cases, 2 deaths; typhoid, 17 cases, 4 deaths.
Amherst Island.	F. S. Northmore, M.D.	No; no; only when complaint is made.	
Arran	T. J. McNally, M.D.; A. Neelands, S.I.	Inspection of public buildings annually and upon complaint being made.	Diphtheria, 2 cases, 1 death; typhoid, 1 case.
Alfred	A. A. Gibault, M.D.; Felix Daoust, S.I.	No	Scarlatina, 15 cases; diphtheria, 45 cases, 8 deaths; typhoid, 2 cases.
Amaranth	A. J. Hunter, M.D.	No inspection	None
Anderdon	T. James Park, M.D.; D. Mongeau, S.I.	Yes	Diphtheria, 3 cases; some cases of typhoid.
Albemarle	None; Thos. Evans, S.I..	No; action taken when complaint is made.	
Alnwick	T. C. Lapp, M.D.; James Roberts, S.I.	Inspection at intervals ...	Diphtheria, 10 cases, 1 death; typhoid, 1 case.

TOWNSHIPS.

Is isolation of contagious diseases systematically carried out? State methods adopted and whether any isolation hospital exists.	Is diphtheria anti-toxine in common use by physicians? Give results of treatment in all cases where possible.	Is disinfection after contagious diseases carried out under the personal supervision of an officer of the Board?	Does the Board make systematic inspection of the public schools? Does it require a certificate of vaccination from new school children each year?
In private houses only	None used.....	When required	No; no
Yes; no hospital	No	Yes	Yes; no.....
Yes	No	Not in all cases	No
No	Don't know	No	No
By placarding houses	Used on one patient; good results.	Yes	No
.....	Cannot say.....	Yes	No
When cases are reported isolation is insisted upon by Board of Health.	Used by some physicians; cannot give results.	Not in all cases	No; no
Yes, as far as possible.....	Not in use.....	Generally carried out; only one case known where such was not done.	Yes; no.....
Yes, patient isolated; room disinfected 3 times daily ..	Not generally used; results when used favorable.	Yes	Not special
No cases	Not required .....	.....	No; no
Placed in private room with communication with others	No.....	Yes	Yearly inspection of all schools and public buildings; no.
.....	In severe cases; good results.	By M. H. O	No; no
Isolation complete when necessary.	Don't know	Under supervision of M. H. O.	No; no
The M. H. O. attends to this.	.....	Yes	None
Yes; no hospital; isolation of premises.	Don't know	Yes	No
Isolated at their home	Yes; results have generally been good.	Yes	Can't say.....

TOWNSHIPS.

Name of Municipality.	Are forms for notification by teachers and M. H. O. of contagious diseases supplied? If not, will you explain the reason?	Give the source of water supply used on the premises. Also cause of typhoid fever cases.	Is there systematic inspection of dairy cows made during the year? Have cases of tuberculosis occurred, and state whether the tuberculin test has been used.	How many slaughter houses in municipality? Are they licensed on evidence of being kept in good sanitary condition? How is offal disposed of? Is there systematic inspection of carcasses by any officer of the Board?
Adelaide	Not required ...	Wells; two cases came from New York, can't trace the others.	No; no; no.....	Three
Amabel	Yes	Wells	No; no	Three; no; destroyed; no.
Anson and Hindon.	No	Wells and spring	No tuberculosis in this municipality.	One; in sanitary condition.
Athol	No		No; none	
Algona, S	No	Good water	No	None
Alice and Fraser	Yes		No; no	Some private; no.....
Arthur	To M. H. O....	Wells; cannot give cause of typhoid.	No; 3 cases of tuberculosis reported.	One; no inspection by the Board.
Aldborough	No		No; no	Four; no
Ameliasburg....	Yes	Wells; not known	No; no	Five; yes
Amherst Island.	None	Wells and lake water ...	No; no cases.....	None
Arran	No	Wells; one case from Toronto.	No; none	One; permitted by order of council.
Alfred	No	All wells.....	No	Two
Amaranth	No		No cases of tuberculosis.	None
Anderdon	No		None	None
Albemarle			No	None
Alnwick	Yes	Wells	No	None

TOWNSHIPS.

Is there systematic removal of garbage and night soil? If so on what basis of cost is the removal made? How is the cost calculated?	Is there a public sewerage system? If so what proportion of houses to whole is connected with public sewers?	State No. and kinds of noxious trades. (See sec. 63 Public Health Act.) How licensed and regulated?	Have there been any prosecutions during year under Public Health Act? State in detail the nature of the case, and the results of same.
Private disposal	No	None.....	No
No	No	None.....	None
No	No	None.....	No
.....	.....	.....	No
No	No	None.....	No
No .....	.....	.....	No
No	No	None.....	No
Yes; paid by owners of premises from which garbage or night soil is removed.	No	None.....	No
No.....	No	None.....	No
No.....	No .....	.....	No
No..	No	No	No
No.....	No	None.....	No
No.....	.....	None.....	No
None.....	No	None.....	None
Householders are required to remove all garbage and night soil.	No	None.....	No

TOWNSHIPS.—*Continued.*

Name of Municipality.	Names of Medical Health Officer and Sanitary Inspector.	Is there general sanitary inspection? Is it repeated at intervals every year? or is action taken only when complaint of nuisance is made to Board.	Contagious diseases.
Assiginack and Manitowaning Village.	No M. H. O.....	.....	Diphtheria, 2 cases.....
Ashfield.....	F. McLennan, M.D.....	Action taken when complaint is made.	Typhoid, 3 cases.....
Augusta.....	Wm. H. Wardell, M.D...	When complaints are made	Diphtheria, 6 cases, 2 deaths
Bangor, Wicklow and McClure.	None	No	Diphtheria
Barton	H. Bryant, M.D	Yes, and prompt attention to all complaints.	.....
Bathurst	No M.H.O.; R. D. Hogan, S. I.	Action taken when complaint is made.	Typhoid, 1 case, 1 death
Bedford	W. Parker, M.D.; G. Hamilton, S.I.	Action taken when complaint is made.	Diphtheria, 1 case
Belmont	W. H. Jeff, M.D.; W. H. Johnston, S. I.	Action taken when complaint is made.	Diphtheria, 3 cases
Bentinck	No regular M.H.O.; Chas. Bolmsack, S. I.; Jno. Small, S. I.	Yes, and when complaint is made.	Diphtheria, 2 cases
Bertie.....	N. Brewster, M.D.; J. J. Moore, S. I.; B. Johnston, S. I.	One annual inspection in May and when complaint is made.	Diphtheria, 12 cases, 1 death; typhoid, 3 cases, 1 death.
Bexley	C. N. Laurie, M.D	Only when considered necessary.	.....
Beverly	J. T. Manes, M.D.; E. Clement, S. I.	Action taken when complaint is made to Board.	Typhoid, 8 cases.....
Binbrook	J. W. Smuck, M.D ...	Action only when complaint to Board.	None
Blanchard.....	A. K. Ferguson, M.D	Yes	Scarlatina, 1 case; diphtheria, 2 cases; typhoid, 3 cases.
Blenheim	No M. H. O.; a physician is member of the Board.	Mostly when complaints are made; village inspected each spring.	Scarlatina, 4 cases; diphtheria, 4 cases, 1 death; typhoid, 16 cases, 1 death.

TOWNSHIPS.—*Continued.*

Is isolation of contagious diseases systematically carried out? State methods adopted and whether any isolation hospital exists.	Is diphtheria anti-toxine in common use by physicians? Give results of treatment in all cases where possible.	Is disinfection after contagious diseases carried out under the personal supervision of an officer of the Board?	Does the Board make systematic inspection of the public schools? Does it require a certificate of vaccination from new school children each year?
Yes; no hospital	Cannot say	Yes	No
No	No	No	No
Patients isolated in all cases; no hospital.	.....	Yes .....	.....
No .....	.....	No	No; no
No .....	.....	Sanitary inspector would attend to this if occasion required.	No
No; no	Don't know	Never been necessary in this township.	No
Yes	No	Yes	No; no
Yes	Used when required and furnished by Board.	Yes	No
Yes ...	Not so far as known to Board.	Yes	No; only when necessary.
House placarded; isolation of house or of individual.	Not generally used; where it is, good results follow.	Yes; under supervision of M. H. O.	No; no
.....	Yes	Yes	No; no
Isolated in home as far as possible.	Yes	Yes	No; no
No; no hospital .....	.....	Yes	Yes
Yes; no hospital	Yes; results not reported.	Yes	Yes; no
Yes; no hospital	Physicians use it as occasion requires; successful in 3 cases, failed in 1 owing to it not being used in time.	Yes	In most cases; no

TOWNSHIPS.—*Continued.*

Name of Municipality.	Are forms for notification by teachers and M. H. O. of contagious diseases supplied? If not, will you explain the reason?	Give the source of water supply used on the premises. Also cause of typhoid fever cases.	Is there systematic inspection of dairy cows made during the year. Have cases of tuberculosis occurred, and state whether the tuberculin test has been used.	How many slaughter houses in municipality? Are they licensed on evidence of being kept in good sanitary condition? How is offal disposed of? Is there systematic inspection of carcasses by any officer of the Board.
Assiginack and Manitowaning Village.	Yes	Wells	No	Two; not licensed; offal fed to hogs.
Ashfield.....	No	Wells; typhoid cases caused by impure water.	No	Two; Yes; offal fed to hogs.
Augusta.....	No	Wells .....	.....	Four; not licensed
Bangor, Wicklow and McClure.	No .....	.....	No	One
Barton .....	.....	Wells	No	18; not licensed; offal cooked or steamed and fed to hogs.
Bathurst	No	Wells; said to be from bad water.	No	None.....
Bedford.....	No	Spring water	No; no	None.....
Belmont	No	No typhoid fever	No; no	None.....
Bentinck	Yes.....	Wells	No; no cases of tuberculosis reported.	One
Bertie.....	Forms supplied physicians.	Wells; can't say cause of typhoid.	No; no	Slaughtering only by local butchers; not licensed; offal is buried or burned; no inspection of carcasses.
Bexley	Don't have any forms.	Wells, mostly	No; no	1; no license; no
Beverly	Yes	Springs and wells; pollution of springs in certain cases the cause of typhoid.	No; no; no.....	3; not licensed; offal fed to pigs; no inspection of carcasses by any officer of the Board.
Binbrook	Yes .....	.....	No inspection; no cases of tuberculosis.	1; no license; boiled and fed to hogs; no.
Blanchard.....	Yes	Wells; not traceable to any distinct cause.	No; yes; yes	4; no; buried; no
Blenheim	To medical men only.	Wells; probably drinking water.	No; yes.....	7; no; burnt in most cases; no.

TOWNSHIPS.—*Continued.*

Is there systematic removal of garbage, and night soil? If so on what basis of cost is the removal made. How is cost calculated?	Is there a public sewerage system? If so what proportion of houses to whole is connected with public sewers.	State No. and kind of noxious trades. (See sec. 63 Public Health Act.) How licensed and regulated?	Have there been any prosecutions during year under Public Health Act? State in detail the nature of the case, and results of same.
By householder	No	None.	No.
No	No	None.....	No.
Garbage and night soil disposed of by householder.	.....	None.....	No.
No	No .....	.....	No.
No	No	Except slaughter-houses.	No.
Removed by private parties.	No	None	No.
.....
No	No	No	None.
No	No .....	.....	No.
No	No	None	No.
.....	No	None	No.
No	No	None	No.
Generally removed by owner.	.....	None	No.
No	No	None	No.
No ...	No	None	No.

TOWNSHIPS.—*Continued.*

Name of Municipality.	Names of Medical Health Officer and Sanitary Inspector.	Is there general sanitary inspection? Is it repeated at intervals every year? or is action taken only when complaint of nuisance is made to Board.	Contagious diseases.
Blandford	E. Bromley, M.D.; W. B. Wilson, S. I.	No; no; generally.....	Typhoid, 1 case
Bosanquet.....	W. J. Chapman, M.D	Every year	Diphtheria, 4 cases
Brant	A. B. Taylor, M.D.; Wm. Rowland, S. I.	Action taken when complaint is made.	Diphtheria, 8 cases, 1 death; typhoid, 4 cases.
Brighton	N. B. H. Dean, M.D.; W. H. Rutten, S. I.	Not general; when complaint is made.	Scarlatina, 12 cases, 1 death; diphtheria, 1 case; typhoid, 2 cases.
Brunell	J. W. Hart, M.D	When complaint is made..	.....
Brudenell and Lyndoch.	None; Joseph Kineler, S.I.	When complaint is made..	None
Brougham	T. D. Galligan, M. D.; John Munson.	When complaint is made..	None
Brooke	A. McKinnon, M.D .....	.....	Diphtheria, 3 cases
Burford	Robt. Harbottle, M.B.; D. H. Hamilton, S. I.	When complaint is made..	Scarlatina, 1 case; diphtheria, 2 cases; typhoid, 2 cases.
Burleigh, A., and Chandos.	R. A. Caldwell, M.D	When complaint is made..	Typhoid, 5 cases, 1 death.....
Caledon	James Algie, M.D.; R. Davis, S.I.	Villages under special inspection.	Diphtheria, 8 cases, 1 death; typhoid, 5 cases, 2 deaths.
Cartwright	None	When complaint is made..	Typhoid, 2 cases, 1 death.....
Carden	None ..	.....	None
Cardwell	Thos. H. Young, M.D....	Action taken when complaint is made.	Typhoid, 2 cases, 1 death
Carnarvon.....	F. R. R. Berry, M.D	No	Diphtheria, 4 cases.....
Carrick	R. E. Clapp, M.D.; Wm. Clubin, S. I.	Sanitary inspection of villages, also school houses, churches, etc.	Typhoid, 10 cases

TOWNSHIPS.—*Continued.*

Is isolation of contagious diseases systematically carried out? State methods adopted and whether any isolation hospital exists.	Is diphtheria anti-toxine in common use by physicians? Give results of treatment in all cases where possible.	Is disinfection after contagious diseases carried out under the personal supervision of an officer of the Board?	Does the Board make systematic inspection of the public schools? Does it require a certificate of vaccination from new school children each year?
Fairly; no hospital	No; know of none	No	No; no
No isolation hospital; patients isolated.	Not used	Under physician in attendance.	No
Yes; usual method of isolation.	Not in use	Yes	No; no
Yes	No	Yes	No
No	No	Yes	No
Patients isolated at homes ..	.....	Yes	No
No	No	No	No
Patients isolated .....	.....	.....	.....
.....	No	No	No
Yes	Anti-toxine on hand; no cases.	Yes	No; no
.....
As far as practicable .....	.....	Yes	No; no
Yes, where they exist .....	.....	Yes	No
Yes	No cases	Yes	No
Family isolated .....	.....	No	No
No hospital; carried out as far as possible.	No .....	.....	Yes; no

TOWNSHIPS.—*Continued.*

Name of Municipality.	Are forms for notification by teachers and M.H.O. of contagious diseases, supplied? If not, will you explain the reason?	Give the source of water supply used on the premises. Also cause of typhoid fever cases.	Is there systematic inspection of dairy cows made during the year. Have cases of tuberculosis occurred, and state whether the tuberculin test has been used.	How many slaughterhouses in municipality? Are they licensed on evidence of being kept in good sanitary condition? How is offal disposed of? Is there systematic inspection of carcasses by any officer of the Board.
Blandford . . .	No	Wells	No; yes	1; no; used as manure; no.
Bosanquet	To M. H. O.		No cases of tuberculosis.	1; offal fed to hogs when cooked; carcasses not inspected.
Brant	Yes	Wells; drinking bad water.	No	9; licensed; buried. . . .
Brighton	Yes	Don't know	No	4; licensed; no inspection of carcasses.
Brunell	No	Spring water	No; no	
Brudenell and Lyndoch.	No	Spring water	No	None.
Broughan.	No		No	None
Brooke				
Burford		Wells	No	Number varies in the season; no inspection of carcasses or animals.
Burleigh, A., and Chandos.	No	Wells	No	None.
Caledon	Yes	Wells and springs		7; offal buried
Cartwright . . .	No	Wells; attributed to impure water.	No; no	None
Carden	No	Wells	No	None
Cardwell	No	Springs and wells	No	None
Carnarvon.	No		No	None.
Carrick	No	Wells; in all probability polluted water.	No	

TOWNSHIPS.—*Continued.*

Is there systematic removal of garbage and night soil? If so on what basis of cost is the removal made. How is the cost calculated?	Is there a public sewerage system? If so what proportion of houses to whole is connected with public sewers.	State No. and kinds of noxious trades. (See sec. 63 Public Health Act.) How licensed and regulated?	Have there been any prosecutions during year under Public Health Act? State in detail the nature of the case, and results of same.
None whatever	No	No	None.
.....	.....	None	No.
No	No	None	None.
No	None	None	No.
No	No	None	No.
No	No	None	No.
.....	No	None	No.
.....
No	No	None	No.
.....	.....	.....	None.
No	No	None	No.
No	No	None	No.
No	No	None	No.
.....	No	None	No.
No	No	None	No.

TOWNSHIPS.—*Continued.*

Name of Municipality.	Names of Medical Health Officer and Sanitary Inspector.	Is there general sanitary inspection? Is it repeated at intervals every year? or is action taken only when complaint of nuisance is made to Board.	Contagious diseases.
Carlow	None	None	None
Cavin	Henry Turner, M.D.	No; no; yes	Typhoid, 1 case
Cambridge	F. M. Perris, M.D.	No; no; sometimes	Diphtheria, 7 cases, 7 deaths
Caistor	R. H. De LaMatter, M.D.; E. Gillespie, S. I.	Only where complaint is made.	None.....
Cayuga, S. ....	.....	When complaint is made..	Diphtheria, 1 case, 1 death.....
Clarence	A. N. DesRosier, M.D.; T. Perrin, S. I.; W. J. Tucker, S. I.	When complaint is made..	Diphtheria, 16 cases, 4 deaths; typhoid, 30 cases, 4 deaths.
Claradon and Mills	None	No ....	.....
Clarke	None; members of Board inspect their respective districts.	General inspection of schools, cheese-factories and slaughter-houses, and when complaints is made.	Diphtheria, 7 cases, 3 deaths; typhoid, 10 cases.
Chaffey	H. L. Howland, M.D.; W. H. Lehman, S.I.	When complaint is made..	None
Charlottesville ..	Alex. Falkner, M.D.; D. Dickson, S. I.	Action taken when complaint is made.	Scarlatina, 4 cases; Diphtheria, 3 cases, 3 deaths.
Charlotteville ..	W. P. McInnes, M.D.; A. Wood, S.I.; Thos. L. Roberts, S.I.	When complaint is made..	None
Chapman.....	P. T. Tyerman, M.D.	No; no; yes	None

TOWNSHIPS—Continued.

Is isolation of contagious diseases systematically carried out? State methods adopted and whether any isolation hospital exists.	Is diphtheria anti-toxine in common use by physicians? Give results of treatment in all cases where possible.	Is disinfection after contagious diseases carried out under the personal supervision of officer of the Board?	Does the Board make systematic inspection of the public schools? Does it require a certificate of vaccination from new school children each year?
No	No	No	No
Yes; houses placarded and isolated in many cases, patients sent to public hospital.	No	Yes	No; no
No; no	No .....	.....	Seldom
By placarding	No	Yes	No; no
.....	No	No .....	.....
Yes	No	Sometimes	No; no
.....	.....	.....	No
Isolated in house	Not used	No; under supervision of physician.	Yes; no
Yes	Don't know	Yes	No
Yes	Cannot say; has been used in two cases with no appreciable effect.	M. H. O. attends to this.	No
Yes	No	Yes	No
.....	No	No diseases	No; no

TOWNSHIPS.—*Continued.*

Name of Municipality.	Are forms for notification by teachers and M. H. O. of contagious diseases supplied? If not, will you explain the reason?	Give the source of water supply used on the premises. Also cause of typhoid fever cases.	Is there systematic inspection of dairy cows made during the year. Have cases of tuberculosis occurred, and state whether the tuberculin test has been used.	How many slaughter houses in municipality? Are they licensed on evidence of being kept in good sanitary condition? How is offal disposed of? Is there systematic inspection of carcasses by any officer of the Board.
Carlow	No	Spring water	No	None
Cavin	Yes	Well; not known	No	One; no
Cambridge	No	Wells	No	One
Caistor	Yes	Wells	No	Four
Cayuga, S. ....	.....	.....	No	None.....
Clarence	No	Wells	No	Four; no license; kept in bad order.
Claradon and Mills.....	.....	Wells	No	None.....
Clarke	To physicians only.	Wells	None in township...	Three; not licensed; offal disposed of in various ways.
Chaffey	No	Springs and wells ....	.....	Two
Charlotterburg .	Yes	Wells	No; tuberculosis is not uncommon and owners would be glad to apply tubercular test if there was any convenient way of doing so.	Two
Charlottesville ..	Yes	Wells	No	Don't know
Chapman	No	Springs	No	None.....

TOWNSHIPS.—*Continued.*

Is there systematic removal of garbage and night soil? If so on what basis of cost is the removal made. How is the cost calculated?	Is there a public sewerage system? If so what proportion of houses to whole is connected with public sewers.	State No. and kinds of noxious trades. (See sec. 63 Public Health Act.) How licensed and regulated?	Have there been any prosecutions during year under Public Health Act? State in detail the nature of the case, and results of same.
No	No	None	No.
No	No	None	No.
No	No; none	None	No.
No	No	No	No.
.....	.....	.....	None.
No	No	None	No.
.....	No	None	No.
.....	.....	None	No.
.....	.....	.....	No.
No .....	.....	None	No.
.....
No	No	None	No.
Householders removal night-soil and garbage.	No	None	No.

TOWNSHIPS—*Continued.*

Name of Municipality.	Names of Medical Health Officer and Sanitary Inspector.	Is there general sanitary inspection? Is it repeated at intervals every year? or is action taken only when complaint of nuisance is made to Board.	Contagious diseases.
Christie	J. Waddy, M.D.	When complaint is made..	None
Cockburn Island	None; Wm. Johnston, S.I.	No; when complaint is made.	None
Colchester, N. ..	Jas. Brien, M.D.	When complaint is made..	.....
Cornwall	H. J. Harrison, M.D.	General inspection made in spring time.	Scarlatina, 14 cases, 3 deaths; diphtheria, 10 cases, 2 deaths; typhoid not reported.
Cramahe	A. W. Stinson, M.D.	When complaint is made..	None
Crosby, S	D. A. Coon, M.D.	No	None
Crowland	S. H. Glasgow, M.D.; A. O. Skinner, S. I.	Action taken when complaint is made.	Scarlatina, 1 case; typhoid, 2 cases.
Culross.....	J. Gillies, M.D. ....	.....	Typhoid, 2 cases.....
Dalhousie and N. Sherbrooke	A. Downing, M.D.	No; only when complaint is made.	Scarlatina, 2 cases
Darlington	J. C. Mitchell, M.D.	Yes; once every year.....	Diphtheria, 1 case; typhoid, 25 cases.
Dawn	A. Galbraith, M.D.; James C. Brown, S. I.	When complaint is made..	None
Delaware.	F. H. Mitchell, M.D.; James Harris, S. I.	No; house to house inspection every spring in villages; action always taken on complaint.	None
Denbigh, Abinger and Ashly.	Chas. D. Doig, M.D.	When complaint is made..	None
Derby.....	Chas. E. Barnhart, M.D.; James Agners, S. I.	Annual inspection of schoolhouses and slaughterhouses, and action taken on complaint.	Scarlatina, 10 cases; typhoid, 1 case.
Dorchester, N. ..	A. Graham, M.D.	When complaint is made..	Typhoid, 2 deaths

TOWNSHIPS.—Continued.

Is isolation of contagious diseases systematically carried out? State methods adopted and whether any isolation hospital exists.	Is diphtheria anti-toxine in common use by physicians? Give results of treatment in all cases where possible.	Is disinfection after contagious diseases carried out under the personal supervision of an officer of the Board?	Does the Board make systematic inspection of the public schools? Does it require a certificate of vaccination from new school children each year?
Yes	Don't know	Yes	No; no
No	No	Yes	No
.....	Yes	Yes	No
No hospital; isolation carried out according to law.	Yes; almost uniformly successful if used.	Yes ..	No
No hospital; isolation is carried out.	.....	Yes	No; no
.....	.....	.....	No
Carried out as far as possible.	No cases of diphtheria..	Yes	No; no.....
.....	.....	.....	No
House placarded and patient isolated from others.	No cases of diphtheria this year.	No	No; no
Yes	No return	Yes	No; no
No cases	No diphtheria	No occasion	One school inspected on complaint of whooping cough.
Ordinary precautions taken; no hospital.	Not used yet	Yes	Yes
Not required	No cases of diphtheria to treat.	No occasion	No
Don't know	Don't know	No	Yes; no.....
Yes	Not in common use	When Board thinks it necessary.	Not required

TOWNSHIPS.—*Continued.*

Name of Municipality.	Are forms for notification by teachers and M. H. O. of contagious diseases, supplied? If not, will you explain the reason?	Give the source of water supply used on the premises. Also cause of typhoid fever cases.	Is there systematic inspection of dairy cows made during the year. Have cases of tuberculosis occurred, and state whether the tuberculin test has been used.	How many slaughterhouses in municipality? Are they licensed on evidence of being kept in good sanitary condition? How is offal disposed of? Is there systematic inspection of carcasses by any officer of the Board.
Christie	No	Wells	No	None.....
Cockburn Island	No	Wells	No	None.....
Colchester, N ..	No .....	.....	No	None.....
Cornwall	Teachers not supplied.	.....	No; yes; yes	Two; no; offal is buried.
Cramahe	Yes	Wells	No; no cases occurred.	None.....
Crosby, S	No forms	Wells	No; no	Three; no; no
Crowland	None.....	Wells	No; no cases of tuberculosis.	None.....
Culross.....	No .....	.....	No	Three; no inspection of carcasses.
Dalhousie and N. Sherbrooke	No .....	.....	No; no ..	None.....
Darlington	To medical men only.	Wells ..	No; no.....	One
Dawn	No .....	.....	No; no cases of tuberculosis.	One; not licensed
Delaware.....	Yes	Springs	No; no ..	Two; offal fed to hogs; no inspection of carcasses.
Denbigh, Abinger and Ashly.	No .....	.....	No; no.....	None; no; no.....
Derby.....	Don't know.....	Wells; cannot give cause of typhoid.	.....	One; yes; don't know; no.
Dorchester, N..	Yes .....	.....	No	Four.....

TOWNSHIPS — *Continued*

Is there systematic removal of garbage, and night soil? If so on what basis of cost is the removal made. How is cost calculated?	Is there a public sewerage system? If so what proportion of houses to whole is connected with public sewers.	State No. and kind of noxious trades. (See sec. 63 Public Health Act.) How licensed and regulated?	Have there been any prosecutions during year under Public Health Act? State in detail the nature of the case, and results of same.
Householders remove their own.	No	None	No.
.....	No	None	No.
No			
No	No	None ..	No.
No	No	None	No.
No	No	None	No.
Yes		None	No.
.....	No	None	No.
No	No	None	No.
No	No	None	No.
No	No	None	No.
No ; by householder	No	No	
No	No	None	No
No	No	None	No.
Garbage removed when complaint has been made at expense of the parties causing nuisance.	No	None	No

TOWNSHIPS.—*Continued.*

Name of Municipality.	Names of Medical Health Officer and Sanitary Inspector.	Is there general sanitary inspection? Is it repeated at intervals every year? or is action taken only when complaint of nuisance is made to Board.	Contagious diseases.
Douro.....	A. R. Fraser, M.D.; John S. Quinn, S. I.	No; action promptly taken upon complaint.	Scarlatina, 17 cases, 7 deaths; diphtheria, 18 cases, 3 deaths.
Dover.....	J. S. Algar, M.D.....	Action taken when nuisance is complained of.	Diphtheria, 25 cases; typhoid, 20 cases.
Dumfries, N....	Adam Thompson, M.D.; A. Burnett and James Malone, S. Inspectors.	Inspection once a year, and when complaint is made.	Scarlatina, about 15 to 20 cases; diphtheria, 2 cases, 1 death; typhoid, 4 cases.
Dumfries, S....	J. Addison M.D.; G. S. Wait, S. I.	Yes; yes.....	Typhoid, 1 case.....
Dunn.....	N. Hopkins, M.D.....	When complaints are made	None.....
Dungannon...	A. S. Leavett, M.D.....	Only when complaint is made.	Scarlatina, 2 cases.....
Draper.....	S. Bridgland, M.D.....	Action taken when complaint is made.	None.....
Drummond....	None.....	No.....	None.....
Dysart.....	Wm. Giles, M.D.....	Action taken on complaint	None.....
Downie.....	J. J. Paul, M.D.....	.....	Diphtheria, 12 cases, no deaths..
Easthope, S....	Robert Whiteman, M.D..	Only when complaint is made to Board.	Scarlatina, 7 families; diphtheria, 1; typhoid, 2.
Edwardsburg..	S. C. McLean, M.D.; T. H. Button, S.I.	Action taken when complaint is made to Board.	Scarlatina, 3 cases; typhoid, 2 cases.
Egremont.....	A. L. Brown, M.D.....	No; action taken when complaint is made to the Board.	Medical men fail to report, have heard of no cases.
Elderslie.....	Members of Board are sanitary inspectors. No M. H. O.	Yes.....	Typhoid, 1 case, 1 death.....

TOWNSHIPS.—Continued.

Is isolation of contagious diseases systematically carried out? State methods adopted and whether any isolation hospital exists.	Is Diphtheria anti-toxine in common use by physicians? Give results of treatment in all cases where possible.	Is disinfection after contagious diseases carried out under the personal supervision of an officer of the Board?	Does the Board make systematic inspection of the public schools? Does it require a certificate of vaccination from new school children each year?
Yes; soon as possible without hospital.	No; principally from the difficulty of securing fresh samples.	Yes	No; no
No hospital; patients are isolated from other members of family.	Two cases treated by one physician, both ended fatally.	Yes	No
No	Used in two cases, one case good results, the other no effect.	Yes, in case of diphtheria	No; no
Yes; houses placarded and patients isolated from other members of family.	No diphtheria	Yes, in most cases	Yes; no
.....	.....	Yes	No; no
Yes	No	Yes	No
.....	No cases	No cases	No
No	No	No	No
Yes	No	Yes	No; no
Patients are isolated in their homes, and whole family quarantined.	It is used effectually, as we have had no deaths from diphtheria.	Yes, by M. H. O. and attending physicians.	Yes; of water, privies, etc.
Yes; house and patients isolated and quarantined.	Not in use	Not if attending physician gives certificate that such has been thoroughly done.	No; no
Yes; no hospital	No cases of diphtheria, and no anti-toxine used.	No	No; no
No	Don't know	Don't know	No; no
.....
Yes	No	Yes	Yes

TOWNSHIPS.—*Continued.*

Name of Municipality.	Are forms for notifications by teachers and M. H. O. of contagious diseases supplied? If not, will you explain the reason?	Give the source of water supply used on the premises. Also cause of typhoid fever cases.	Is there systematic inspection of dairy cows made during the year. Have cases of tuberculosis occurred, and state whether the tuberculin test has been used.	How many slaughter houses in municipality? Are they licensed on evidence of being kept in good sanitary condition? How is offal disposed of? Is there systematic inspection of carcasses by any officer of the Board.
Douro.....	Yes	Wells	No; no tuberculosis.	None.
Dover.....	Yes	Wells; pollution by barnyard sewage in majority of cases.	No	None.....
Dumfries, N... ..	No	Wells and springs generally.	Yes; cows that supply milk are generally inspected; no.	Ten; yes; cooked and fed to hogs; no,
Dumfries, S... ..	Yes .....	.....	Yes; no.....	Two; permit granted on evidence; no.
Dunn	No	Wells and cistern water.	No; no; no.....	None.....
Dungannon	No	Wells	No; none.....	None.....
Draper	No	Wells	No none.....	None
Drummond.....	Yes .....	.....	No	Two
Dysart	No	Wells	No	None.....
Downie	No .....	.....	No; no; no.....	One, in winter months, as Board will not grant permission in summer months.
Easthope, S... ..	Yes	Wells; in one case polluted well.	No; no; no	4; not licensed; generally fed to pigs; no inspection of carcasses.
Edwardsburg... ..	No	Wells	No.....	3; not licensed.....
Egremont	No; when such occurs teachers and parents are notified to see that children affected are kept from school for the required period.	Wells; chiefly bad water.	No.	1; no; not any
Elderslie	Yes	Wells	No; no tuberculosis.	None.....

TOWNSHIPS.—*Continued.*

Is there systematic removal of garbage, and night soil? If so on what basis of cost is the removal made. How is cost calculated?	Is there a public sewerage sys- tem? If so what proportion of houses to whole is connect- ed with public sewers.	State No. and kind of noxious trades. (See sec. 63 Public Health Act.) How licensed and regulated?	Have there been any prosecu- tions during year under Pub- lic Health Act? State in de- tail the nature of the case, and results of same.
No.....	No	None.....	No.
No.....	No	None.....	No.
.....	.....	.....	No.
No.	No	None.....	No.
No.....	No	None.....	No.
No.....	No	None.....	No.
No.. ..	No	None.....	No.
No.....	No	None.....	No.
No.....	No	None.....	No.
No.....	No	One slaughter house	No.
No	Not any	Not any	No.
No	No	None	No.
No	No	None	No.
.....	No .....	.....	No.

TOWNSHIPS — *Continued.*

Name of Municipality.	Names of Medical Health Officer and Sanitary Inspector.	Is there general sanitary inspection? Is it repeated at intervals every year? or is action taken only when complaint of nuisance is made to Board.	Contagious diseases.
Eldon	J. F. Ross, M.D.	Action taken only when nuisance is complained of.	None
Elma.	H. Douglas, M.D.	Action is only taken when complaint is made.	Typhoid, 8 cases.
Emily.	F. J. Bradd, M.D.	Action taken when complaint is made.	Scarlatina, 5 cases; diphtheria 12 cases, 5 deaths.
Elmsley	No M. H. O.; B. S. Snyder, S. I.	Only when complaint is made.	None
Eramosa . . .	J. R. Dryden, M.D.	Action taken when complaint is made to Board or M. H. O.	Diphtheria, 3 cases; typhoid, 14.
Ernestown	J. E. Mallue, M.D.; G. Ferguson, S. I.	General inspection in spring, afterwards on complaint.	Diphtheria, 3 cases; typhoid, 15 cases.
Erin	None	No general inspection.	
Essa	J. W. Morris, M.D.	Yes; twice a year or oftener, as necessity requires.	Diphtheria, a few mild cases.
Esquesing	None; D. McGuire, S. I. .	Yes	
Euphrasia	Thos. E. Bennett, M.D.; N. L. Curry, S. I.	Only on complaint.	Diphtheria, 16 cases, 3 deaths; typhoid, 3 cases.
Floss.		Yes	Diphtheria, 1 case
Faraday	James Sager, M.D.; Chas. Styne, S. I.		Scarlatina, 4 cases.
Fenelon	J. W. Ray, M.D.	No; no; yes.	Typhoid, 1 case, 1 death.
Ferris . . .	J. B. Carruthers, M.D.; A. Gendreau, S. I.	No	None

TOWNSHIPS.—*Continued.*

Is isolation of contagious diseases systematically carried out? State methods adopted and whether any isolation hospital exists.	Is Diphtheria anti-toxine in common use by physicians? Give results of treatment in all cases where possible.	Is disinfection after contagious diseases carried out under the personal supervision of an officer of the Board?	Does the Board make systematic inspection of the public schools? Does it require a certificate of vaccination from new school children each year?
No.....	No.....	Yes	No.....
Yes; by placarding and preventing all ingress or egress; no hospital.	Not in use.....	Yes	No.....
Yes; in dwelling; no hospital.	No.....	Only in diphtheria cases.	No; no
Yes.....	No.....	Yes	No.....
Fairly well; isolation of patients; placarding house; no hospital.	Has been used in all cases, and all recovered rapidly; attributed partly to anti-toxine.	Yes	No.....
Yes; in homes	Yes; good	Yes	No; no
No.....	Don't know	No.....	No.....
No.....	.....	Yes	Yes
Yes	Used by some and has been successful.	Not required this year..	Inspected by public school inspector and sanitary inspector.
Yes	Yes	Yes	No.....
Yes .....	.....	.....	.....
Yes	Not used.....	Yes	No.....
Yes	No diphtheria for years.	Yes	No.....
Yes	No occasion to use it....	Yes	No.....

TOWNSHIPS.—*Continued.*

Name of Municipality.	Are forms for notification by teachers and M. H. O. of contagious diseases supplied? If not, will you explain the reason?	Give the source of water supply used on the premises. Also cause of typhoid fever cases.	Is there systematic inspection of dairy cows made during the year. Have cases of tuberculosis occurred, and state whether the tuberculin test has been used.	How many slaughter houses in municipality? Are they licensed on evidence of being kept in good sanitary condition? How is offal disposed of? Is there systematic inspection of carcasses by any officer of the Board?
Eldon	Not lately...	Wells	No inspection; no cases of tuberculosis reported.	1; not licensed; no inspection of carcasses.
Elma	No	Wells; supposed to be defective drainage.	No inspection; no..	4; not licensed; no inspection of carcasses.
Emily	Yes	Wells	No.....	None.....
Elmsley	No .....	.....	No.....	None.....
Eramosa	M. H O. only...	Wells; some cases thought to come from wells.	No; no tuberculosis.	2; inspected; no systematic inspection of carcasses.
Ernestown	Yes	Wells; usually low water; creek or lake; occasionally bad drinking water.	No.....	5; yes; fed to hogs; no.
Erin	No	Wells and springs	No.....	1; not licensed.....
Essa	No	Wells	No; none has appeared yet.	2; inspected
Esquesing	No .....	.....	No; no	3; no license.....
Euphrasia	Yes	Wells; water bad	No; no	3; not licensed; no inspection.
Floss .....	.....	.....	.....	.....
Faraday	No .....	.....	No; no	None.....
Fenelon	No	Wells; supposed to be from impure water.	No.....	3; no; don't know; no.
Ferris	No	Wells and streams	No.....	None.....

TOWNSHIPS.—Continued.

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TOWNSHIPS.—*Continued.*

Name of Municipality.	Names of Medical Health Officer and Sanitary Inspector.	Is there general sanitary inspection? Is it repeated at intervals every year? or is action taken only when complaint of nuisance is made to Board.	Contagious diseases.
Fitzroy	W. A. Kyle, M.D.....	.....	Diphtheria, 13 cases, 3 deaths; typhoid, 3 cases; scarlatina, 10 cases.
Flamboro', E..	A. C. Jones, M.D.; B. Smuck. S. I.	No; no; only when complaint is made.	None reported.....
Flamboro', W..	A. E. Stutt, M.D.; J. E. Addison, M.D.; Chas. Foster, S. I.	General inspection in spring, and when complaint is made.	Diphtheria, 2 or 3 cases, 1 death; typhoid, 1 case, 1 death
Fredricksburg, S	.....	.....	None
Fullerton	W. J. Armstrong, M.D....	No.....	Scarlatina, 7 cases; typhoid, 1 case.
Gainsboro'	J. W. Collver, M.D.; members of board are sanitary inspectors.	No; no; when complaints are made.	None
Garafraxa, E....	.....	.....	Scarlet fever, 4 cases, 1 death....
Garafraxa, W..	James Dow, M.D.; W. H. Cowan, S. I.	Yes; once a year, and action taken when complaints are made.	Typhoid, several cases
Garden Island..	J. Garrett, M.D.; S. Kennedy, S. I.	Yes; twice a year	None
Georgina	C. T. Noble, M.D	No; only when complaint is made.	Diphtheria, 1 case
Glanford	Cyrus Smith, M.D.; J. S. Coon, S. I.	Action taken on complaint or observation.	None
Glanmorgan .....	.....	.....	Some cases of diphtheria
Glenelg	James Gun, M.D.	Action taken when complaint is made.	Diphtheria, 3 cases, 2 deaths; typhoid, 1 case, 1 death.

TOWNSHIPS.—*Continued.*

Is isolation of contagious diseases systematically carried out? State methods adopted and whether any isolation hospital exists.	Is diphtheria anti-toxine in common use by physicians? Give results of treatment in all cases where possible.	Is disinfection after contagious diseases carried out under the personal supervision of an officer of the Board?	Does the Board make systematic inspection of the public schools? Does it require a certificate of vaccination from new school-children each year?
Yes		Yes	
No need for it	Don't know	Don't know	No; no
Diphtheria cases were removed to Hamilton hospital.	Don't know	Yes	Yes; no
			No.
Houses placarded and inmates not allowed to mingle with the public.	No diphtheria	Yes	No.
No; as well as possible with an hospital.	No.	Imperfectly	No; no
Yes			
Yes; patients are placed in separate apartment.	No.	Yes	Yes
Cases of contagion are usually removed to Kingston Hospital.	Don't know	Yes	Yes; twice a year
Yes	No.	No.	No; no
No	No.		No; no
Houses placarded, etc.		Yes	
Houses placarded and patients isolated as well as possible; no hospital.	Don't know	Under direction of attending physician.	No; no

TOWNSHIPS.—*Continued.*

Name of Municipality.	Are forms for notification by teachers and M. H. O. of contagious diseases, supplied? If not, will you explain the reason?	Give the source of water supply used on the premises. Also cause of typhoid fever cases.	Is there systematic inspection of dairy cows made during the year. Have cases of tuberculosis occurred, and state whether the tuberculin test has been used.	How many slaughter houses in municipality? Are they licensed on evidence of being kept in good sanitary condition? How is offal disposed of? Is there systematic inspection of carcasses by any officer of the Board.
Fitzroy				
Flamboro', E ..	No ; no	Streams and wells	No ; no	2 ; no license.....
Flamboro', W ..	No	Wells	Yes ; no tuberculosis detected.	12 ; yes ; offal is fed to swine.
Fredricksburg, S ..			No.....	None.....
Fullerton.....	No	Wells	No.....	None.....
Gainsboro'	No.....	No typhoid.....	No ; no	One ; no ; buried ; no..
Garafraxa, E ..				
Garafraxa, W ..	No.....	Wells and springs	No dairy in township ; veterinary surgeons have reported some cases of tuberculosis ; tuberculin test was used in one case.	One, not licensed ; offal is burnt or buried ; no systematic inspection of carcasses.
Garden Island..		River St. Lawrence.....	No.....	None
Georgina	No.....	Wells	No	None
Glanford	Yes	Wells	No ; no ; no.....	Seven, are permitted on condition of being kept in sanitary condition ; offal is boiled and fed to hogs and used for fertilizing purposes.
Glanmorgan		Wells		
Glenelg	To medical men.	Wells and springs.....	No ; none	None

TOWNSHIPS.—Continued.

Is there systematic removal of garbage, and night soil? If so on what basis of cost is the removal made. How is cost calculated?	Is there a public sewerage system? If so what proportion of houses to whole is connected with public sewers.	State No. and kind of noxious trades. (See sec. 63 Public Health Act.) How licensed and regulated?	Have there been any prosecutions during year under Public Health Act? State in detail the nature of the case, and results of same.
No	No		
Yes	No	None	
No	No	None	No.
No	No	None	No.
No	No	None	No.
No	No	None	No.
Yes; from school houses and other public buildings; let by tender in most cases.	No	Two; storing of hides and slaughterhouses.	No.
Yes; at householder's expense.	No	None	No.
		None	No.
No	No	None but slaughterhouses.	No.
No	No	None	No.

TOWNSHIPS.—*Continued.*

Name of Municipality.	Names of Medical Health Officer and Sanitary Inspector	Is there general sanitary inspection? Is it repeated at intervals every year? or is action taken only when complaint of nuisance is made to Board.	Contagious diseases.
Gloucester.....	— Kennedy, M.D.; Chas. O. Wood, S. I.; John Poulaka, S. I.	Yes	Scarlatina, 3 cases; diphtheria, 30 cases, 7 deaths; typhoid, 3 cases.
Goderich	J. B. Whitely	Only when nuisance is complained of.	.....
Gosfield, S	Wm. Douglas, M.D	Action taken when complaint is made.	Scarlatina, 3 cases
Gosfield, N.....	G. McKenzie, M.D.; J. B. Cottam, S. I.	Action taken on complaint to Board.	None
Goulbourn	G. C. Richardson, M.D. ...	Action taken when complaint is made.	Diphtheria, 5 cases, 2 deaths; typhoid, 8 cases.
Gower, S	None	No; action taken only when complaint is made.	None
Gower, N	F. B. Harkness, M.D.	Action taken on complaint.	Typhoid, 1 case.....
Grattan	J. F. Dowling, M.D. . .	No; no action taken only when complaint is made.	Scarlatina, 3 cases
Greenock.....	No M.H.O.; W. G. Ritchie, S. I.; G. Sawyer, S. I.	Once a year and oftener when complaints are made.	Typhoid, 3 cases, 1 death.....
Grey	Malcolm Ferguson, M.D. .	Action taken when complaint is made to Board; school houses and cheese factories are inspected once a year.	Diphtheria, 2 cases, 1 death.....
Grimsby, N	J. W. Alway, M.D.	Only when complaint of nuisance is made.	Typhoid, 6 cases
Grimsby, S.....	H. P. Henning, M.D. ....	.....	Scarlatina, 8 cases; diphtheria, 2 cases, 1 death.
Guelph.....	Walter Clarke, M.D.	When complaints are made	Scarlatina, 1 case, 1 death; diphtheria, 4 cases; typhoid, 4 cases.
Gwillimbury, N.	None	No	Diphtheria, 3 cases.....
Gwillimbury, W.	None	No	None

TOWNSHIPS.—Continued.

Is isolation of contagious diseases systematically carried out? State methods adopted and whether any isolation hospital exists.	Is Diphtheria anti-toxine in common use by physicians? Give results of treatment in all cases where possible.	Is disinfection after contagious diseases carried out under the personal supervision of an officer of the Board?	Does the Board make systematic inspection of the public schools? Does it require a certificate of vaccination from new school children each year?
Isolation hospital at Ottawa city.	.....	Yes	No.
.....	Don't know	Yes	Yes
.....	.....	Yes	No.
.....	.....	Yes	No; no
Yes	Yes, in 2 cases, 1 recovered, 1 fatal.	Yes	No; no
No.	Don't know	No.	No.
Ordinary precautions.	No diphtheria	Never has been.	No.
Yes	Not generally used, but when so is very satisfactory.	Yes	For; no
Yes	None used.	Yes	Yes
Yes; ordinary methods adopted.	No.	No.	Yes, but no certificate of vaccination required.
No hospital	Don't know	Yes	No.
Yes; in private houses.	Yes, if found necessary..	Directions are given but not personally attended to.	No; no
Yes	Yes; most cases favorable.	Yes	Yes; yes
Yes	It has been used with good results	Yes	No.
.....	Don't know .....	.....	No.

TOWNSHIPS.—*Continued*

Name of Municipality.	Are forms for notification by teachers and M. H. O. of contagious disease, supplied? If not, will you explain the reason?	Give the source of water supply used on the premises. Also cause of typhoid fever cases.	Is there systematic inspection of dairy cows made during the year. Have cases of tuberculosis occurred, and state whether the tuberculin test has been used.	How many slaughter houses in municipality? Are they licensed on evidence of being kept in good sanitary condition? How is offal disposed of? Is there systematic inspection of carcasses by any officer of the Board.
Gloucester		Wells	Not for some years.	Eight to ten; none licensed; are examined twice yearly.
Goderich	Yes			Three; not licensed; kept in sanitary condition; buried and burned.
Gosfield, S	Yes	Wells	No	None
Gosfield, N	No	Wells	No	Two; not licensed; fed to pigs in some cases; no inspection.
Goulbourn			No; no; no	None
Gower, S	No		No	None
Gower, N	No	Wells	No	One
Grattan	No	Wells	No; no	One; not licensed
Greenock	Yes	Wells	No dairy cows inspected; no tuberculosis; no tuberculin test	Seven; all licensed
Grey	No	Wells	No	One; kept in sanitary condition.
Grimsby, N	Yes	Springs	No	None
Grimsby, S	Yes	Wells	No	Don't think there any regular slaughter houses not licensed; offal is not allowed to collect; no.
Guelph	M. H. O. only..	Wells; impure water thought to be the cause.	Yes; no cases of tuberculosis.	Two; no; boiled and fed to hogs.
Gwillimbury, N. Yes		Wells	No	One or two
Gwillimbury, W. No			No	Don't know of any

TOWNSHIPS.—*Continued.*

Is there systematic removal of garbage, and night soil? If so on what basis of cost is the removal made. How is cost calculated?	Is there a public sewerage system? If so what proportion of houses to whole is connected with public sewers.	State No. and kind of noxious trades. (See sec. 63 Public Health Act.) How licensed and regulated?	Have there been any prosecutions during year under Public Health Act? State in detail the nature of the case, and results of same.
Officers are constantly looking after garbage and any other refuse.	No.....	None except piggeries...	No.
.....	No.....	None.....	No.
No.....	No.....	None.....	No.
No.....	No.....	None.....	No.
No.....	No.....	None.....	No.
No.....	No.....	None.....	No.
No.....	No.....	None.....	No.
No.....	No.....	None.....	No.
No.....	No.....	None.....	No.
No.....	No.....	None.....	No.
All garbage is removed by householders.	No.....	None.....	No.
No.....	No.....	None.....	No.
Each householder attends to removal of garbage and night soil.	No.....	None.....	No.
Removed by householders.	No.....	.....	No.
No.....	No.....	None.....	No.
No.....	No.....	.....	No.

TOWNSHIPS.—*Continued.*

Name of Municipality	Names of Medical Officer and Sanitary Inspector.	Is there general sanitary inspection? Is it repeated at intervals every year? or is action taken only when complaint of nuisance is made to Board?	Contagious diseases.
Gwillimbury, E.	None; S. Vandewater, S. I.; Wm. Hill, S. I.	When complaint action is taken.	Diphtheria, 4 cases
Hagerty, Sherwood, Jones, Richards and Burns.	James Reeves, M.D.; Martin Corrigan, S.I.	Action taken when complaints are sent in.	Scarlatina, 3 cases; diphtheria, 5 cases; typhoid, 2 cases
Hagerman	C. O'Gorman, M.D.; Wm. Castell, S.I.	Yes; yes	Diphtheria, 7 cases, 1 death; typhoid, 1 case, 1 death.
Hallowell	J. M. Tory, M.D	No; no; yes	Scarlatina, 1 case, 1 death; typhoid, 4 cases, 2 deaths.
Hamilton	None	Only when complaint is made.	Scarlatina, 2 cases; typhoid, 4 cases, 1 death.
Harwich	Chas. B. Longford, M.D.; John M. Burk, S.I.	Action taken only when complaint is made to Board.	Diphtheria, 17 cases, 2 deaths; typhoid, 6 cases.
Hawkesbury, E.	No M. H. O.; N. Pillow, S.I.	No general inspection; inspection on complaint of nuisance.	Scarlatina, 2 or 3 cases; diphtheria, 3 cases.
Hawkesbury, W.	No M. H. O.; John D. Campbell, S. I.	Yes; twice a year and action taken when complaints are made.	None reported
Harvey	None	Yes; by members of Board.	None
Hay	B. Campbell, M.D.	Personal inspection made annually.	Scarlatina, 1 case; diphtheria, 16 cases, 1 death; typhoid, 5 cases, 1 death.
Hibbert	None	Yes	None
Hillier	J. B. Ruttan, M.D.; — Wallace, M.D.	No; no; yes	Typhoid, 1 case.
Himsworth, S..	J. A. Porter, M.D.; Alex. Wasson, S. I.	Yearly inspection not repeated; action taken when complaint is made.	Scarlatina, 23 cases; diphtheria, 2 cases; typhoid, 2 cases.
Hinchinbrook ..	Jas. Lockhart, M.D	Only when complaint is made.	None

TOWNSHIPS.—Continued.

Is isolation of contagious diseases systematically carried out? State methods adopted and whether any isolation hospital exists.	Is diphtheria anti-toxine in common use by physicians? Give results of treatment in all cases where possible.	Is disinfection after contagious diseases carried out under the personal supervision of an officer of the Board?	Does the Board make systematic inspection of the public schools? Does it require a certificate of vaccination from new school children each year?
Yes	Not used.....	Yes	No.....
Houses placarded and fumigated.	Has been used on one case, had no apparent effect.	Yes	No.....
Yes	No.....	Yes	Yes; no.....
Yes; houses placarded; patient isolated; disinfectants thoroughly used.	Yes; it is kept on hand, but had no cases.	No; attended to by M.H.O.	No; no.....
Yes; houses placarded; no hospital.	Don't know	Yes	No; no.....
Yes; houses placarded; sanitary police appointed to guard houses day and night; no hospital.	Yes; so far as is known 2 deaths in 17 cases.	Yes	Yes; no.....
Yes	No.....	No.....	No; no.....
Yes	Yes; successful	Yes	No; no.....
Yes	Yes; some time ago; in several cases, all recovered.	Yes	No; no.....
Yes	Yes; 16 cases treated, 1 death; cases successfully immunized.	Yes	Yes; no.....
No cases of contagious disease.	No cases .....	.....	Yes; no.....
No	No	No.....	No.....
Yes	No.....	Yes	No.....
Not required	None needed .....	.....	No.....

TOWNSHIPS.—Continued.

Name of Municipality	Are forms for notification for teachers and M. H. O. of contagious diseases supplied? If not, will you explain the reason?	Give the source of water supply used on the premises. Also cause of typhoid fever cases.	Is there systematic inspection of dairy cows made during the year? Have cases of tuberculosis occurred, and state whether the tuberculin test has been used?	How many slaughterhouses in municipality? Are they licensed on evidence of being kept in good sanitary condition? How is offal disposed of? Is there systematic inspection of carcasses by any officer of the Board?
Gwillimbury, E.	To physicians only.	Wells	No dairies	Seven; no license; no inspection of carcasses; offal fed to hogs.
Hagerty, Sherwood, Jones, Richards and Burns.	No. ....	.....	No; no	None
Hagerman	No.....	Wells and lake water ...	No.....	None; no
Hallowell	No.....	Wells; springs; from impure water in 2 cases.	No; no tuberculin test, and no cases of tuberculosis.	4; no; fed and buried; no.
Hamilton ...	Don't know ...	.....	No.....	3; licensed and inspected; offal is buried; no inspection of carcasses.
Harwich .....	.....	Well water	No.....	6; no; fed to hogs; no.
Hawkesbury, E.	Physicians only.	Wells, springs and rivers.	No; no	5; not licensed; offal buried; no inspection.
Hawkesbury, W.	No.....	Wells	No; no cases of tuberculosis.	3; no; consumed by dogs and some allowed to decay.
Harvey	Supplied to physicians.	Wells	No; no tuberculosis; no test.	None
Hay	Yes	Wells .....	.....	Four
Hibbert	No.....	Wells	No cases	1; not licensed; good sanitary condition.
Hillier	No.....	Wells	No; no	1; no; fed to swine; no.
Himsworth, S..	No.....	Spring water	No; no	2; yes; offal fed to hogs; no.
Hinchinbrook ..	No.....	.....	No; no	None

TOWNSHIPS.—*Continued.*

Is there systematic removal of garbage and night soil? If so on what basis of cost is the removal made? How is the cost calculated?	Is there a public sewerage system? If so what proportion of houses to whole is connected with public sewers?	State No. and kinds of noxious trades. (See sec. 63 Public Health Act.) How licensed and regulated?	Have there been any prosecutions during year under Public Health Act? State in detail the nature of the case, and results of same.
No.	No.	None.	No.
No.	No.	None.	No.
Parties are notified by inspector and closets are cleaned in spring.	No.	None.	No.
No.	No.	1 tannery, 2 cheese factories, 4 evaporators.	No.
No.	No.		No.
		None.	No.
No.	No.	None.	No.
No.	No.	No.	No.
Yes	No.	None.	No.
No.	No.	None.	No.
No.	No.	None.	No.
No.	No.	None.	No.
No.	No.	None.	No.

TOWNSHIPS.—*Continued.*

Name of Municipality.	Names of Medical Health Officer and Sanitary Inspector.	Is there general sanitary inspection? Is it repeated at intervals every year? or is action taken only when complaint of nuisance is made to Board.	Contagious diseases.
Hope	D. E. Beatty, M.D	General inspection... ..	None.....
Horton.....	.....	.....	Diphtheria, 4 cases, 2 deaths....
Huron	D. A. McCrummon, M.D.; Thos. Moore, S.I.	Yes; once a year	Scarlatina, 9 cases
Houghton	None	When complaint is made..	Diphtheria, 1 case, 1 death.....
Hungerford ...	None	Action taken when complaint is made.	Scarlatina, 20 cases, 2 deaths; typhoid, 1 case.
Howe Island ..	E. Ryan, M.D.....	Yes	None.....
Howick	A. M. Spence, M.D	Board inspects as a body..	None
Hullett	Thos. Agnaw, M.D	When complaint is made to Board.	Typhoid, 10 cases
Humberston....	M. F. Haney, M.D.; Elias Augustine, S.I.	Inspection is made as required and always in response to complaint.	Scarlatina, 2 cases; diphtheria, 2 cases, 1 death; typhoid, 7 cases, 1 death.
Humphrey ...	T. W. N. Young, M.D ...	No; no; action taken when complaint is made.	None
Huntingden ...	Ed. Harrison, M.D.; Hector Wood, S. I.	Only on complaint being made.	Typhoid, 1 case.....
Huntley	G. H. Graves, M.D.....	.....	Typhoid, 2 cases; diphtheria, a few cases, 1 death; scarlet fever, a large number of cases.
nnisfl.....	A. T. Little, M.D.; J. L. Sloan, S. I.; J. M. Mathews, S. I.	Only when complaint is made,	Diphtheria, 7 cases; typhoid, 3 cases, 2 deaths.
Jocelyn	None; Fred. Ross, Wm. Kent, W. Mansfield, S. Is.	When complaint is made..	None.....
Johnson and Tarbutt.	F. Parker, M.D	No	Diphtheria, 3 cases in one family.

TOWNSHIPS.—*Continued.*

Is isolation of contagious diseases systematically carried out? State methods adopted and whether any isolation hospital exists?	Is diphtheria anti-toxine in common use by physicians? Give results of treatment in all cases where possible?	Is disinfection after contagious diseases carried out under the personal supervision of an officer of the Board?	Does the Board make systematic inspection of the public schools? Does it require a certificate of vaccination from new school children each year?
Placards	No diphtheria	Yes	No.
Yes	No.	Yes	No.
Yes	No.	Yes	No; no
Yes; no.	Don't know	No.	No; no
Yes	No.	Yes	No.
No need. ....	.....	.....	Sometimes
Patients isolated in their homes.	No.	M. H. O. disinfects.	No; no
No.	No.	Yes	No.
Yes	No.	Not always	No.
Yes	No cases	Yes	No; no
No.	Used to some extent.	No	No; no
Yes .....	.....	.....	.....
Yes	Yes	Yes	Yes; no
No cases since 1894 .....	.....	.....	Don't know
House closed to public	Don't know	Yes	No

TOWNSHIPS.—*Continued.*

Name of Municipality.	Are forms for notification by teachers and M. H. O. of contagious diseases supplied? If not, will you explain the reason?	Give the source of water supply used on the premises. Also cause of typhoid fever cases.	Is there systematic inspection of dairy cows made during the year? Have cases of tuberculosis occurred, and state whether the tuberculin test has been used.	How many slaughter houses in municipality? Are they licensed on evidence of being kept in good sanitary condition? How is offal disposed of? Is there systematic inspection of carcasses by any officer of the Board?
Hope	Yes	Wells	No; no	3; not licensed; some fed to hogs.
Horton	No	Wells	No; no	None
Huron	To M. H. O....	Wells; no cases	No; no	2; yes; buried; no....
Houghton	No	Wells and springs	No; no	None
Hungerford ...	Supplied to physicians.	Wells and springs	No; no	Three
Howe Island ...	.....	St. Lawrence River....	No	None
Howick	No	Springs	No	Two
Hullett	Yes	Wells; no cause ascertained.	No	1; no
Humberston...	No	Wells	No dairy cows; no tuberculosis.	4; kept in sanitary condition; offal buried.
Humphrey	Yes	Wells	No; no tuberculosis.	1; not licensed
Huntingden...	Don't know ...	Wells	No; no	6; no; fed to hogs; no.
Huntley .....	.....	.....	.....	.....
Innisfil	No	Wells	No	3; no license; no inspection.
Jocelyn	No	Surface water	No; none; no...	None
Johnson and Tarbutt.	No	Spring creeks	No	No

TOWNSHIPS.—*Continued.*

Is there systematic removal of garbage, and night soil? If so on what basis of cost is the removal made, How is the cost calculated?	Is there a public sewerage system? If so what proportion of houses to whole is connected with public sewers.	State No. and kinds of noxious trades. (See sec. 63 Public Health Act.) How licensed and regulated?	Have there been any prosecutions during year under Public Health Act? State in detail the nature of the case, and results of same.
Premises inspected if complaints are made.	None.....	None.....	No.
.....	No.	None.....	No.
No.	No.....	None.....	No.
.....
No.	No.	Slaughtering of animals ; boiling soap.	No.
No.....	None needed	None.....	No.
By householder	No.....	None.....	No.
No.....	No.....	None.....	.....
By householder.....	No.....	None, except 1 hide packer.	No.
No.....	No.....	None.....	No.
None.....	No.....	None.....	No.
.....
No	No	Don't know	No.
.....	No	None	No.
No	No	None	No.

TOWNSHIPS.—*Continued.*

Name of Municipality.	Names of Medical Health Officer and Sanitary Inspector.	Is there general sanitary inspection? Is it repeated at intervals every year? or is action taken only when complaint of nuisance is made to Board?	Contagious diseases.
Joly	D. Carmichael, M.D.	No .....	.....
Kaladar, etc. ....	.....	Action taken when complaint is made.	None
Kennebec	John R. Nelson, M.D.; Jas. Fallon, S. I.	Each spring and when complaints are made.	None
Keppel .....	.....	.....	Typhoid outbreak caused 5 deaths.
Kincardine	Thos. Bradley, M.D.; R. McKenzie, S. I.	When complaint is made..	Diphtheria, 2 cases; typhoid, 3 cases.
King.	T. J. Norman, M.D.; Thos. Jennings, S. I.	When complaint is made..	Diphtheria, 1 case; typhoid, 9 cases, 1 death.
Kingston.....	None	No	Diphtheria, 6 cases, 2 deaths
Kinloss	Jno. S. Tennett, M.D.	Only when complaint is made.	Diphtheria, 3 cases
Kitley	M. L. Dixon, M.D.; no meeting of Board.	.....	.....
Lavant.....	K. Kilbourn, M.D.	No; no	None
Laxton, Digby and Langford.	F. Blanchard, M.D.	Action taken only when complaint is made.	None
Lindsay and St. Edmond.	J. W. Kitchen, M.D.	Only when complaint is made.	Typhoid, 1 case; contracted outside of municipality.
Logan	A. Dalton Smith, M.D.	Action taken only when complaint is made.	None
London	D. G. McNull, M.B.; A. Cumming, S. I.	Only when complaint is made.	Diphtheria, 2 cases; typhoid, 24 cases.
Lochiel	A. L. McDonald, M.D.	Action only taken when complaint is made.	Scarlatina, 3 cases; typhoid, 2 cases, 1 death.
Louth.....	G. M. Bowman, M.D.; D. G. Smith, S. I.	Yes .....	.....
Laird .....	.....	No; no.....	Typhoid, 1 case
Luther, E.	Alfred Skippen, M.D.; P. McLellan, S. I.	During summer inspection at intervals.	Diphtheria, 3 cases; typhoid, 15 cases.
Luther, W.	W. W. Jones, M.D.; J. Lovell.	When complaints are made.	Diphtheria, 1 case
Laurier and Lount.	None.....	No.....	None

TOWNSHIPS.—*Continued.*

Is isolation of contagious diseases systematically carried out? State methods adopted and whether any isolation hospital exists.	Is diphtheria anti-toxine in common use by physicians? Give results of treatment in all cases where possible.	Is disinfection after contagious diseases carried out under the personal supervision of an officer of the Board?	Does the Board make systematic inspection of the public schools? Does it require a certificate of vaccination from new school children each year?
None reported.....	Don't know	Don't know	No
.....	.....	.....	No
.....	.....	.....	No
Yes .....	.....	Yes .....	.....
Houses placarded .....	.....	Yes	No
Houses placarded and all communications forbidden.	No	Yes	No; no
None	Used in 3 cases	Yes	No
Individually isolated.....	No	Yes	No; no
.....
.....	.....	.....	No
No hospital	No cases	It is the intention	No; no
No hospital; placard premises, etc.	Don't know	Yes	No
No.....	No	No	No; no
Yes; by sending patients to county and city hospital.	Yes	No; no	No; no
Yes	Yes	Yes	No; no
No.....	No .....	.....	Yes; no.....
Yes	No	Yes	No; no
Yes	No	No	No; no
Yes	No	Yes	No
No.....	.....	No	No

TOWNSHIPS.—*Continued.*

Name of Municipality.	Are forms for notification by teachers and M. H. O. of contagious diseases supplied? If not, will you explain the reason?	Give the source of water supply used on the premises. Also cases of typhoid fever cases.	Is there systematic inspection of dairy cows made during the year? Have cases of tuberculosis occurred, and state whether the tuberculin test has been used.	How many slaughter houses in municipality? Are they licensed on evidence of being kept in good sanitary condition? How is offal disposed of? Is there systematic inspection of carcasses by any officer of the Board?
Joly	No			None
Kaladar, etc.		Wells	No	None
Kennebec	No	Wells	No	None
Keppel		Wells		
Kincardine	Yes	Wells	No	2; under supervision of sanitary inspector.
King	No	Wells	No	6; licensed; offal fed to hogs; no inspection of carcasses.
Kingston	No	Wells	No	About 20; no inspection.
Kinloss	No	Springs and wells	No	None
Kitley				
Lavant	No		No; none	None
Laxton, Digby and Langford.		Wells and springs	No; no tuberculosis.	None
Lindsay and St. Edmond.	No	Mostly springs	No	None
Logan	No	Well water	No	One
London	No	Wells; contaminated	No; no	33; yes; generally boiled and fed to hogs.
Lochiel	Yes	Wells; cause unknown	No; no	4; no license; offal buried.
Louth	Yes	No typhoid	No	1; yes; buried; no....
Laird	No	Spring water	No; no	None
Luther, E.	Yes	Artesian wells for schools.	No; yes	One
Luther, W. ...	No		No; no	None
Laurier and Lount.	No	Wells and springs	No	None

TOWNSHIPS.—*Continued.*

Is there systematic removal of garbage and night soil? If so on what basis of cost is the removal made? How is the cost calculated?	Is there a public sewerage system? If so what proportion of houses to whole is connected with public sewers.	State No. and kinds of noxious trades. (See sec. 63 Public Health Act.) How licensed and regulated.	Have there been any prosecutions during year under Public Health Act? State in detail the nature of the case, and results of same.
No	No	None	No.
No	No	None	No.
			No.
			No.
		None	No.
No	No	None	No.
	No	None	No.
No	No	None	No.
No	No	None	No.
No		None	No.
No	No	None	No.
No	No	None	No.
No	No	None	No.
No	No	None	No.
No	No	None	No.
		None	No.
No		None	No.
No	No	None	No.
No	No	None	No.

TOWNSHIPS.—*Continued.*

Name of Municipality.	Names of Medical Health Officer and Sanitary Inspector.	Is there general sanitary inspection? Is it repeated at intervals every year? or is action taken only when complaint of nuisance is made to Board?	Contagious diseases.
Macher	None	No	None
Marysburg, N..	— Platt, M.D.; James Wright, S. I.; D. S. Minaker, S. I.	Only when complaints are made.	None
Malden	T. J. Parke, M.D.	Action taken only when complaint is made.	None
Mattawatchan & Griffith	John Hally, M.D.; Geo. S. Smith, S. I.	When reported to the Board.	None
Mariposa	No M. H. O.; Jas. M. Blewett, S. I.	Yes; yes	Diphtheria, 15 cases, 5 deaths; Typhoid, 20 cases.
Maryborough ..	J. J. Cassidy, M.D.	No; no; only when complaint is made to the Board.	Diphtheria, 2 cases, 2 deaths; typhoid, 15 cases.
Medora & Wood	No M.H.O.; John P. May, S. I.	When complaint is made..	Diphtheria, 12 cases
Mersea	Chas. Chamberlain, M.D.; members of Board act as sanitary inspectors.	Each member of Board makes inspection in his district.	Diphtheria, 6 cases, 2 deaths; typhoid, 10 cases, 2 deaths.
Metcalf	A. Nixon, M.D .....	.....	Diphtheria, 1 case; health of Tp. has been good.
Middleton	J. W. Renwick, M.D.; members of Board look after the district in which they reside.	When complaint is made.	1 case scarlet fever.
Minto	W. A. Harvey, M. D.; Thos. Johnston, S. I.	Yes; of schools and out-houses, and when complaint is made.	.....
Monck	S. Bridgeland, M.D.	No	Typhoid, 2 cases
Monaghan, S. ..	— Wilcon, M.D.	No; no; action only taken when complaint of nuisance is made.	None

TOWNSHIPS.—Continued.

Is isolation of contagious diseases systematically carried out? State methods adopted and whether any isolation hospital exists.	Is diphtheria anti-toxine in common use by physicians? Give results of treatment in all cases where possible.	Is disinfection after contagious diseases carried out under the personal supervision of an officer of the Board?	Does the Board make systematic inspection of the public schools? Does it require a certificate of vaccination from new school children each year?
Yes		Yes	No
Don't know	Don't know	Yes	No
			No ; no
No	No	No	No
Yes	No ; when used has been successful.	Yes	Yes
No	No	Yes	No
Yes ; confined to house ; notices put up.	Don't know	Yes	No ; no
Yes ; no hospital	No	Yes	When complaint is made.
Yes			
No	No	No	Only on complaint
Yes ; no hospital	Don't know	Yes	No ; no
No	No	Yes	No ; no

TOWNSHIPS.—Continued.

Name of Municipality.	Are forms for notification by teachers and M. H. O. of contagious diseases supplied? If not, will you explain the reason?	Give the source of water supply used on the premises. Also cause of typhoid fever cases.	Is there systematic inspection of dairy cows made during the year? Have cases of tuberculosis occurred, and state whether the tuberculin test has been used?	How many slaughter houses in municipality? Are they licensed on evidence of being kept in good sanitary condition? How is offal disposed of? Is there systematic inspection of carcasses by any officer of the Board?
Machar	Yes.	Wells	No	One
Marysburg, N.	No	Wells	No ; no ; no	One ; no license ...
Malden	Yes	Drilled wells	No ; no	One; not licensed ; offal fed to hogs.
Mattawatchan & Griffith	No	Wells	No	None
Mariposa	Yes	5 schools have bad wells, 2 schools dry wells, 6 schools no wells ; supplied from neighbors.	No	Three
Maryborough ..	No ..	Wells	No	Two ; no ; buried and fed to hogs.
Medora & Wood ..	No .....	.....	No ; no ; no	One ; offal buried.....
Mersea.	Yes	Wells ; most of the typhoid cases were young men who had been working in the stave mills in Bromney.	No ; no	One ; not licensed ; usually fed to hogs ; no inspection of carcasses.
Metcalf .....	.....	.....	.....	.....
Middleton ....	.....	.....	.....	.....
Minto	Yes .....	.....	No ; none.....	Five; yes; fed to swine; no.
Monck	No	Wells	No ; no ; no.....	Two ; not licensed ...
Monaghan, S ..	No	Springs and wells	No	None.....

TOWNSHIPS.—*Continued.*

Is there systematic removal of garbage and night soil? If so on what basis of cost is the removal made? How is the cost calculated?	Is there a public sewerage system? If so what proportion of houses to whole is connected with public sewers.	State No. and kinds of noxious trades. (See sec. 63 Public Health Act.) How licensed and regulated?	Have there been any prosecutions during year under Public Health Act? State in detail the nature of the case and results of same.
No	No	None	No.
No	No	None	No.
.....	No	None	No.
No	No	None	No.
Yes .....	.....	Three slaughterhouses ..	No.
No	No	None	No
No	No	None	No.
No	No ..	None	No.
.....
.....
No ..	No	None	No.
.....	No	None	No.
No ..	No	None	No.

TOWNSHIPS.—*Continued.*

Name of Municipality.	Names of Medical Health Officer and Sanitary Inspector.	Is there general sanitary inspection? Is it repeated at intervals every year? or is action taken only when complaint of nuisance is made to Board.	Contagious diseases.
Monaghan, W..	No M. H. O.; James M. Davidson, S. I.	No; no; action taken by Board when notified.	Typhoid, 2 cases.....
Mornington	James Johnson, M.D.	Yes	Scarlet fever, 1 case; typhoid, 3 cases; 1 death.
Moore	F. R. Seager, M.D.	No; action taken when complaint is made.	None reported.....
Moulton	N. Hopkins, M.D.; Wm. Hamilton, H. Logan, Jno. Williams, James Wardell, S. Inspectors	When complaint is made.	None
Murray.....	P. J. Clune, M.D.; Wm. Ruttan, S. I.	Only when complaint is made.	.....
Muskoka	A. P. Corne'l, M.D.	Only when complaint is made.	.....
Mulmur	R. L. Island, M.D.	Yes; no; yes, action taken upon complaint.	Diphtheria, 1 case, 1 death; typhoid, 10 cases.
Metchedash	No M. H. O. no inspector.	Action taken when reported.	No contagious diseases.....
Mattawa	None .....	.....	None
Mara	Wm. Gilpin, M.D.; Gilbert Gillespie, S. I.	Inspection is made only on complaint.	Diphtheria, 4 cases; typhoid, 3 cases; no deaths.
Mayo	None	No official action ever taken.	Diphtheria, 4 cases; 1 death....
Manvers.	L. Lapp, M.D.; no inspector.	Action taken when complaint is made.	Typhoid, 4 cases; 1 death
Marmora & Lake	W. G. McKechine, M.D..	No general inspection....	Scarlatina. 20 cases; diphtheria, 9 cases, 3 deaths; typhoid, 10 cases.
March	G. H. Groves, M.D.	A thorough inspection is made.	Scarlatina prevalent; typhoid, 6 cases, 1 death; diphtheria, 7 cases, 1 death.

TOWNSHIPS.—*Continued.*

Is isolation of contagious diseases systematically carried out? State methods adopted and whether any isolation hospital exists.	Is diphtheria anti-toxine in common use by physicians? Give results of treatment in all cases where possible.	Is disinfection after contagious diseases carried out under the personal supervision of an officer of the Board?	Does the Board make systematic inspection of the public schools? Does it require a certificate of vaccination from new school children each year?
Patients sent to Nicholas hospital, Peterboro'.	Don't know	No	No ; no
Yes ; as thoroughly as possible.	No	Yes	Yes
Yes ; houses placarded, etc.; no hospital.	No	Not general	No ; no
Yes .....	.....	Yes	No ; no
.....	.....	.....	No
Yes	No cases of diphtheria ..	Yes	No
Yes ; Public warned against coming in ; afflicted family not permitted to mingle with others ; no isolated hospital.	.....	Not at all times	No ; no
.....	.....	When required .....	.....
No.....	No.....	No.....	No.....
No ; no isolation hospital. ..	Yes ; in common use	No ; parties are instructed what to do and are left to do it themselves.	No.....
No hospital .....	.....	No.....	No.....
Yes ; no hospital.	No.....	Yes ; under direction of M. H. O.	No.....
Houses placarded ; no hospital.	Yes ; anti-toxine is used.	As a rule it is	No ; no
Yes	Yes ; in common use.....	.....	.....

TOWNSHIPS.—Continued.

Name of Municipality.	Are forms for notification by teachers and M. H. O. of contagious diseases supplied? If not, will you explain the reason?	Give the source of water supply used on the premises. Also cause of typhoid fever cases.	Is there systematic inspection of dairy cows made during the year. Have cases of tuberculosis occurred, and state whether the tuberculin test has been used.	How many slaughter houses in municipality? Are they licensed on evidence of being kept in good sanitary condition? How is offal disposed of? Is there systematic inspection of carcasses by any officer of the Board.
Monaghan, W..	No	Wells	No ; no ; no.....	Four ; yes ; cannot say.
Mornington	Physicians are supplied.	Wells	When occasion requires it ; no cases of tuberculosis.	Four ; not licensed ; offal generally burnt.
Moore	Yes	Wells	No ; no ; no.....	Two ; not licensed ; offal fed to hogs ; no inspection of carcasses.
Moulton	Yes	Wells	No	Two ; not licensed ; used as fertilizer ; no.
Murray	No .....	.....	No	Two ; no ; buried ; no.
Muskoka	M. H. O. only..	Wells	No	Two ; offal fed to hogs ; no inspection.
Mulmur	Yes	Wells ; 8 cases caused by impure water.	No	One ; don't know.....
Metchedash .....	.....	Wells	No inspection	None.....
Mattawa	No.....	Rivers and wells.....	None	None.....
Mara	No.....	Wells	None	One slaughterhouse ; not licensed ; no inspection.
Mayo	No.....	Springs, wells and streams	No .....	.....
Manvers.	Yes	Wells	No	Three slaughterhouses ; not licensed.
Marmora & Lake	No ; cannot give a reason.	Wells and springs	No	Two slaughterhouses ; no inspection.
March. ....	.....	.....	.....	.....

TOWNSHIPS —Continued.

Is there systematic removal of garbage, and night soil? If so on what basis of cost is the removal made. How is cost calculated?	Is there a public sewerage system? If so what proportion of houses to whole is connected with public sewers.	State No. and kind of noxious trades. (See sec. 63 Public Health Act.) How licensed and regulated?	Have there been any prosecutions during year under Public Health Act? State in detail the nature of the case, and results of same.
None	No	None	No.
Yes	No	None	No.
No	No	Slaughter houses.....	No.
No	No	None	No.
.....	No	None	No.
.....	No	None	No.
No	No	None	No.
.....	.....	.....	None.
No.....	No.....	None.....	None.
No; householders clean their own closets and yards.	No.....	.....	None.
.....	.....	None.....	None.
No.....	No.....	None.....	No.
No.....	No.....	.....	None.
.....

TOWNSHIPS.—*Continued.*

Name of Municipality.	Names of Medical Health Officer and Sanitary Inspector.	Is there general sanitary inspection? Is it repeated at intervals every year? or is action taken only when complaint of nuisance is made to Board.	Contagious diseases.
Maidstone	R. F. Rourke, M.D.....	The Board did not consider it necessary to make any inspection.	Diphtheria, 1 case; typhoid, 1 case.
Melahnide	J. J. Kingston, M. D.; Asa Miller, S. I.	.. .. .	Diphtheria, 1 case .. .
Medonte.	J. H. Harvie, M.D.; A. W. Heaslip, M.D.; Wm. Moffatt, S.I.; Jas. Martin, S. I.	Action is taken only when complaint is made to the Board.	No cases of contagious diseases..
Melancthon	Dr. Reid, M. H. O.; Wm. Auguston, S. I.	A general inspection once a year.	Scarlatina, 3 cases, 1 death; diphtheria, 5 cases, 2 deaths
Madoc.	Dr. Harrison, M. H. O....	Inspection made upon complaint.	Diphtheria, 4 cases, 1 death.
Minden	Dr. Curry, M. H. O.....	There is no general inspection.	Diphtheria, 17 cases, 1 death....
Macaulay	S. Bridgland, M.D.	No; action taken only when complaint is made.	None
McDougall	T. S. Walton, M. D.; Benjamin Namen, Reuben Draper, sanitary inspectors.	When complaint is made..	.....
McLean and Ridout..	No M. H. O.; H. S. Grist, S. I.	General inspection.....	None
McKillop	None.....	.....	Diphtheria, 1 case; 1 death
McKim	R. B. Struthers, M.D.....	Village is regularly inspected.	Scarlatina, 9 cases; diphtheria, 2 cases; typhoid, 10 cases; 1 death.
McMurrich	H. L. Barber, M.D.; Wm. Pearce, S. I.	Yes	Diphtheria, 6 cases, 1 death
McNab	J. G. Cranston, M. D.; David Elliott, S. I.	Yes	Scarlatina broke out in 10 families; no deaths; diphtheria, 21 cases, 1 death; typhoid, 5 cases, 2 deaths.

TOWNSHIPS.—Continued.

Is isolation of contagious diseases systematically carried out? State methods adopted and whether any isolation hospital exists.	Is diphtheria anti-toxine in common use by physicians? Give results of treatment in all cases where possible.	Is disinfection after contagious diseases carried out under the personal supervision of an officer of the Board?	Does the Board make systematic inspection of the public schools? Does it require a certificate of vaccination from new school children each year?
Yes; cases are isolated. ....	.....	.....	.....
Yes; no isolation hospital ..	No.	Yes; under direction of M. H. O. ....	.....
No general methods are adopted. ....	.....	By order of M. H. O.	No inspection is made...
Usual methods adopted; no hospital.	Anti-toxine has been used but effects not satisfactory.	No. ....	.....
As far as possible; no hospital.	Yes; treatment satisfactory. ....	.....	No.
Yes; no hospital.	No.	Not always ..	No.
No; no hospital.	No.	Yes; under M.H.O.	No.
.....
When necessary	None used.	Yes	Yes
No. ....	.....	.....	Yes
Yes; no hospital	No.	Yes	No.
Yes; house fumigated.	Yes; results good	Yes; under direction of M.H.O.	No; no
Yes; as well as it is possible. ....	.....	Yes .....	.....

TOWNSHIPS.—Continued.

Name of Municipality.	Are forms for notification by teachers and M.H.O. of contagious diseases, supplied? If not, will you explain the reason?	Give the source of water supply used on the premises. Also cause of typhoid fever cases.	Is there systematic inspection of dairy cows made during the year. Have cases of tuberculosis occurred, and state whether the tuberculin test has been used.	How many slaughterhouses in municipality? Are they licensed on evidence of being kept in good sanitary condition? How is offal disposed of? Is there systematic inspection of carcasses by any officer of the Board.
Maidstone.....	Yes, forms are supplied.	Wells; sand or gravel soil.	.....	.....
Melahide .....	.....	Springs and wells	No	Seven slaughterhouses; under supervision by S. I.
Medonta	Forms are supplied to the health officers.	Wells and springs	No inspection; no cases of tuberculosis in this township.	Six slaughterhouses in municipality, they are not licensed.
Melanchton ...	No forms .....	.....	No inspection	Five slaughterhouses; not licensed.
Madoc .....	.....	Wells and springs .....	.....	None.....
Minden	No forms .....	.....	No	One; not licensed.....
Macanlay	No	Wells.....	No .....	.....
McDougall .....	.....	.....	.....	.....
McLean and Ridout...	Yes	Wells .....	.....	One
McKillop .....	.....	.....	.....	One
McKim	No	Wells; uncertain; probably from defective sewerage.	No; no	One; no
McMurrich ...	No	Wells	No; no	None
McNab .....	.....	.....	.....	.....

TOWNSHIPS.—*Continued.*

Is there systematic removal of garbage and night soil? If so on what basis of cost is the removal made. How is the cost calculated?	Is there a public sewerage system? If so what proportion of houses to whole is connected with public sewers.	State No. and kinds of noxious trades. (See sec. 63 Public Health Act.) How licensed and regulated?	Have there been any prosecutions during year under Public Health Act? State in detail the nature of the case, and results of same.
.....	.....	.....	None.
.....	No.....	No.....	None.
There is no systematic removal of garbage or night soil.	.....	None.....	None.
.....	.....	.....	None.
No.....	.....	None.....	None.
No.....	No.....	None.....	No.
.....
.....
Yes.....	No.....	None.....	No.
.....	.....	None.....	No.
No.....	No.....	None.....	No.
No.....	No.....	None.....	No.
.....

TOWNSHIPS.—*Continued.*

Name of Municipality.	Names of Medical Health Officer and Sanitary Inspector.	Is there general sanitary inspection? Is it repeated at intervals every year? or is action taken only when complaint of nuisance is made to Board.	Contagious diseases.
Nelson ¹	A. C. Jones, M.D.; Robt. Spence, S. I.	No general inspection; action taken when complaint is made.	Scarlatina, 1 case, 1 death; diphtheria, 1 case, 1 death; typhoid, 1 case, 1 death.
Nepean	G. C. Richardson, M.D.; R. Hill, S. I.	Yes; yes; no	Scarlatina, 5 cases; diphtheria, 8 cases.
Nichol	H. Paget, M.D	Yes .....	.....
Nipissing	No M. H. O.; Francis Sloman, S. I.	Inspection twice a year....	None.....
Nissouri, E	R. E. Fowle, M.D.; Chas. Purdy, S. I.	No; no; yes	Typhoid, 2 cases.....
Normandy	Peter McLean, M.D.; Wm. Umbach, S. I.	Yes	Typhoid, 20 cases
Norwich, N	W. R. Watson, M.D.; John Tophman, S. I.	Yes	Scarlatina, 2 cases; diphtheria, 1 case: typhoid, 5 cases.
Nottawasaga ...	L. McAllister, M.D.; Neil McEacheron, S. I.	When complaint is made..	Scarlatina, 5 cases; diphtheria, 10 cases; typhoid, 6 cases; 3 deaths.
Oakland	W. J. Glassford, M.D	No.....	Typhoid, 1 case
Olden.....	None .....	.....	None
Orillia	Geo. H. Corbett, M.D. ....	.....	Scarlatina, 2 cases.....
Oro	W. H. Clutton, M.D	Yes; no; yes	Diphtheria, 1 case
Ops	Thos. W. Poole, M.D.; W. F. O'Boyle, S. I	Yes; yes; yes	Scarlatina, 3 cases, 1 death; diphtheria, 7 cases, 1 death; typhoid, 1 case.
Oso	H. N. Coutlee, M.D.; W. Kilbour, M.D	No.....	Typhoid, 1 case
Osprey	John A. Scott, M.D.....	Only when complaint is made.	Diphtheria, 53 cases, 6 deaths ..

TOWNSHIPS—Continued.

Is isolation of contagious diseases systematically carried out? State methods adopted and whether any isolation hospital exists.	Is diphtheria anti-toxine in common use by physicians? Give results of treatment in all cases where possible.	Is disinfection after contagious diseases carried out under the personal supervision of officer of the Board?	Does the Board make systematic inspection of the public schools? Does it require a certificate of vaccination from new school children each year?
Yes	Don't know	Don't know	Don't know
Yes	Yes; results good	Yes	No; no
Yes .....	.....	Had no disease of contagious nature.	No
No.....	No.....	Yes	Yes
Not very; physician in attendance gives instructions.	No.	No.....	No; no
Yes	Yes; apparently with good results.	Yes	Inspection by personal visits.
Yes	No.....	Yes	Yes; no
Yes	Don't know; yes .....	.....	Teachers are notified to report cases.
No.....	Don't know	No.....	No.....
No.....	No.....	No.....	No.....
Yes .....	.....	Yes	Yes
Yes, as far as possible.....	Only one mild case has occurred since the introduction of anti-toxine.	Yes	No; no
Yes, so far as possible.	No.....	Yes .....	.....
No.....	No.....	No.....	No; no
Premises placarded and systematically carried out.	Yes, with good results ..	Yes	No; no

TOWNSHIPS.—*Continued.*

Name of Municipality.	Are forms for notification by teachers and M. H. O. of contagious diseases supplied? If not, will you explain the reason?	Give the source of water supply used on the premises. Also cause of typhoid fever cases.	Is there systematic inspection of dairy cows made during the year. Have cases of tuberculosis occurred, and state whether the tuberculin test has been used.	How many slaughter houses in municipality? Are they licensed on evidence of being kept in good sanitary condition? How is offal disposed of? Is there systematic inspection of carcasses by any officer of the Board.
Nelson	Think not.....	Wells	Don't know of any ; no cases of tuberculosis.	Three; unlicensed; offal is generally fed to hogs.
Nepean	No	Spring wells	No ; no	None.....
Nichol	Yes	Springs	No	None.....
Nipissing	No .....	.....	No	None
Nissouri, E	No .....	.....	No ; no ; no	Three ; not licensed ...
Normandy	Yes	Springs and wells ; cause unknown.	No large dairies ; tuberculin not used on unsuspected cattle.	Three ; all licensed ; offal fed to hogs ; no systematic inspection.
Norwich, N	Yes .....	.....	No ; 1 case cancerous beef, inspected and destroyed.	Three ; no license ; offal buried ; no inspection of carcasses.
Nottawasaga ...	Yes	Good water supply .....	.....	One ; licensed ; no inspection of carcasses.
Oakland	No.....	Wells	No ; no	2 ; fed to hogs ; no....
Olden	No..	Wells and springs	No..	1 ; no ; no ; no.....
Orillia .....	.....	.....	.....	.....
Oro	No.....	Wells	No....	2 ; no license ; fed or buried ; no.
Ops	Yes	Wells	No dairies; no tuberculosis.	5 ; offal is fed to hogs..
Oso	No.....	Spring wells.....	No ; no	None
Osprey	No.....	Wells	No.....	Very few.....

TOWNSHIPS.—*Continued.*

Is there systematic removal of garbage and night soil? If so on what basis of cost is the removal made. How is the cost calculated?	Is there a public sewerage system? If so what proportion of houses to whole is connected with public sewers.	State No. and kinds of noxious trades. (See sec. 63 Public Health Act.) How licensed and regulated?	Have there been any prosecutions during year under Public Health Act? State in detail the nature of the case, and results of same.
No.....	No	None	No.
No.....	No	None	No.
No.....	No	No	No.
No.....	No	None	No.
No.....	No .....	.....	No.
No..	No	None	One prosecution for keeping a dirty house
No.....	No	None	No.
Left to discretion of owners.	No	None	No.
No.....	No.....	None.....	No.
.....	No.....	None.....	No.
.....
.....	No.....	None.....	No.
.....	No.....	None.....	No.
No.....	No.....	None.....	No.
No.....	No.....	None.....	No.

TOWNSHIPS — *Continued.*

Name of Municipality.	Names of Medical Health Officer and Sanitary Inspector.	Is there general sanitary inspection? Is it repeated at intervals every year? or is action taken only when complaint of nuisance is made to Board.	Contagious diseases.
Otonabee.....	John M. Shaw, M.D.; Jno. Din-dale, S. I.; John Bell, S. I.	Action taken when complaint is made.	Scarlatina, 15 cases, 4 deaths....
Oxford E.....	J. McLury, M.D	General inspection this year.	Typhoid, 1 case
Oxford W.....	— Ogden, M.D.; James Dickey, S. I.	Yes; two general inspections and action taken when complaint is made.	None.....
Oxford N	T. McWilliams, M.D.; B. Minaker.	Yes; yes; no.....	.....
Palmerston.....	John Elkington, S. I.....	Members of Board report disease.	Typhoid, 3 cases, 1 death
Papineau.	None	Action taken when complaint is made.	None.
Perry	J. M. Cleminson, M.D.; A. M. Sanbone, S. I.	Yes	Diphtheria, 5 cases; typhoid 2 cases.
Perry	H. L. Barber, M.D.; C. McPhail, S. I.	General inspection in spring.	Diphtheria, 16 cases, 1 death; typhoid, 12 cases, 2 deaths.
Pelee	None	Action taken only when complaint is made.	None.....
Pelham .....	.....	Inspection when complaint is made.	A few cases of scarlatina.....
Pickering	None; members of Board act as Inspectors.	Of villages only, and in other parts on complaint only.	Scarlatina, 5 cases; diphtheria, 3 cases, 1 death; typhoid, 14 cases, 1 death.
Pilkington	— Robertson, M.D.; Hugh Roberts, S. I.	Yes	Diphtheria, 1 case.....
Pittsburg	None; members of Board act as Inspectors.	Yes	None.....
Plympton	P. McG. Brown, M.D	No; action taken when complaint is made.	Diphtheria, 1 case
Proton	R. M. Mitchell, M.D. ...	When complaint is made..	Scarlatina, 1 case, 1 death.....

TOWNSHIPS.—Continued.

Is isolation of contagious diseases systematically carried out? State methods adopted and whether any isolation hospital exists.	Is diphtheria anti-toxin in common use by physicians? Give results of treatment in all cases where possible.	Is disinfection of contagious diseases carried out under the personal supervision of an officer of the Board?	Does the Board make systematic inspection of the public schools? Does it require a certificate of vaccination from new school children each year?
Yes	No.....	Yes	No ; no
Yes	No.....	No.....	Yes ; no
Only by card			Yes
No ; no			Yes
Yes	No diphtheria	Yes	Yes
No.....	No.....	No.....	No.....
Patients are isolated.....	Used in three cases with most favorable results, one case which would not respond to ordinary treatment rapidly recovered with the use of anti-toxine.	No ; disinfection carried out by medical attendants.	No ; no
Yes	Yes, results excellent ..	Yes	No ; no
No hospital			No ; no
Yes			
Yes	No.....	Yes	Yes ; no
Yes	Yes	Yes	Yes ; no
			No.....
Yes	Used in one case, patient steadily improved and recovered.	No.....	No ; no
No.....	No cases	Yes	No.....

TOWNSHIPS.—Continued.

Name of Municipality.	Are forms for notification by teachers and M. H. O. of contagious diseases, supplied? If not, will you explain the reason?	Give the source of water supply used on the premises. Also cause of typhoid fever cases.	Is there systematic inspection of dairy cows made during the year. Have cases of tuberculosis occurred, and state whether the tuberculin test has been used.	How many slaughterhouses in municipality? Are they licensed on evidence of being kept in good sanitary condition? How is offal disposed of? Is there systematic inspection of carcasses by any officer of the Board.
Otonabee.....	No.....	.....	No; no; no.....	2; inspected.....
Oxford E.....	.....	.....	No.....	1; no license required; no,
Oxford W.....	No.....	Wells.....	No.....	6; inspected by Sanitary Inspector; boiled if fed, or buried.
Oxford N.....	No.....	Wells.....	No; no.....	3; yes, boiled and fed; no.
Palmerston....	Yes.....	Springs and wells.....	No; no; no.....	None.....
Papineau.....	No.....	Wells.....	No dairies.....	3; no; fed to hogs; no.
Percy.....	To medical men.	Wells.....	No; no.....	2; no; quantity fed to pigs; no.
Perry.....	No.....	Wells.....	No; no.....	1; no.....
Pelee.....	Yes.....	Lake water and artesian wells.	No; no; no.....	None.....
Pelham.....	.....	.....	.....	.....
Pickering.....	Yes.....	Wells; in most cases bad water.	No; no.....	6; yes; buried; no...
Pilkington.....	No.....	Wells; none.....	No; none.....	None.....
Pittsburg.....	No.....	Wells.....	No.....	None.....
Plympton.....	No.....	.....	No tuberculosis; no tuberculin test.	1; not licensed; offal fed to hogs; no inspection of carcasses.
Proton.....	No.....	.....	No.....	None.....

TOWNSHIPS — *Continued.*

Is there systematic removal of garbage and night soil? If so on what basis of cost is the removal made? How is the cost calculated?	Is there a public sewerage system? If so what proportion of houses to whole is connected with public sewers?	State No. and kinds of noxious trades. (See sec. 63 Public Health Act.) How licensed and regulated?	Have there been any prosecutions during year under Public Health Act? State in detail the nature of the case, and the results of same.
No.....	No.....	None.....	No.
No.....	No.....	None.....	No.
.....	.....	Only slaughterhouses ...	No.
No.....	No.....	None.....	No.
No.....	No.....	None.....	No.
No.....	No.....	None.....	No.
No.....	No.....	None.....	No.
.....	.....	.....	No.
No.....	No.....	None.....	No.
.....
No.....	No.....	None.....	No.
No.....	No.....	None.....	No.
No.....	No.....	None.....	No.
No.....	No.....	None.....	No.
No.....	No.....	None.....	No.

TOWNSHIPS.—*Continued.*

Name of Municipality.	Names of Medical Health Officer and Sanitary Inspector.	Is there general sanitary inspection? Is it repeated at intervals every year? or is action taken only when complaint of nuisance is made to Board.	Contagious diseases.
Puslinch	No M. H. O.; Andrew Munro, S. I.	Yes	Diphtheria, 1 case; typhoid, 1 case, 1 death.
Radcliffe and Raglan.	No M. H. O.; Joseph Kinder, S. I.	Action taken when complaint is made.	None.....
Rainham	J. Fry, M.D	Only when complaint is made.	None.....
Raleigh	S. N. Young, M.D	Action taken when complaint is made.	Scarlatina, 1 case
Reach.....	No M. H. O.....	Yes, by members of the Board.	Diphtheria, none reported yet, there have been several cases of a mild type; typhoid, none reported until after death.
Ridout	Joseph Tyrrell, S. I		Diphtheria, 7 cases, 1 death.....
Rochester	R. F. Parke, M.D.; Joseph Strong, S. I.	When complaint is made to Board.	Diphtheria, 8 cases, 6 deaths; typhoid, 2 cases.
Rolph, Buchanan, etc	— Grey, M.D	No.....	None.....
Romney.....	George Wright, M.D.; E. Gibson, S. I.	Only when complaints are made.	None.....
Ryde	S. Bridgland, M.D.; Henry Long, S. I.	No; no; yes	None.....
Ryerson.....	— Crawford, M.D.; D. Stanat, S. I.	Action taken when complaint is made.	Typhoid, 4 cases, 1 death
Sandfield	A. Bang, M.D.....	No; where complaint is made.	None
Sandwich, W ..	R. H. Casgrain, M. D.; M. Gignac, S. I.	.....	Typhoid, 1 case, 1 death
Sandwich, E.....	.....	On complaint to Board ...	Scarlatina, 6 cases; diphtheria, 1 case.
Sandwich, S.....	C. Cruickshank, M. D.; John Healey, S.I.	.....	.....

TOWNSHIPS.—*Continued.*

Is isolation of contagious diseases systematically carried out? State methods adopted and whether any isolation hospital exists.	Is Diphtheria anti-toxine in common use by physicians? Give results of treatment in all cases where possible.	Is disinfection after contagious diseases carried out under the personal supervision of an officer of the Board?	Does the Board make systematic inspection of the public schools? Does it require a certificate of vaccination from new school children each year?
Isolated in room; house placarded; no hospital.	No occasion	Under supervision of Sanitary Inspector.	Yes; no
No hospital .....	.....	Yes	Occasionally; no certificate.
No	Don't know	Yes	No
Yes; houses placarded; no hospital.	No cases	Yes	No; no
No	Don't know	Yes	No
Yes	No	Yes	Yes
Placarding houses	Yes, results good	Not always	No
.....	.....	.....	No; no
No hospital	Yes	Yes	No
Yes .....	.....	Yes	No; no
Yes	No cases	Under Sanitary Inspector.	No; no
No	No	No	No
.....	.....	Yes .....	.....
Placarding; no hospital	No	Yes	No
None, except in their own houses.	Yes	Yes	No; no

TOWNSHIPS.—*Continued.*

Name of Municipality.	Are forms for notification by teachers and M. H. O. of contagious disease, supplied? If not, will you explain the reason?	Give the source of water supply used on the premises. Also cause of typhoid fever cases.	Is there systematic inspection of dairy cows made during the year. Have cases of tuberculosis occurred, and state whether the tuberculin test has been used.	How many slaughter houses in municipality? Are they licensed on evidence of being kept in good sanitary condition? How is offal disposed of? Is there systematic inspection of carcasses by any officer of the Board.
Puslinch	No .....	.....	1 case tuberculosis, cow destroyed.	.....
Radcliffe and Raglan.	.....	Streams and wells	No; no tuberculosis.	None
Rainham	No.....	Wells	No.....	3; by permission
Raleigh	To M. H. O....	Wells	No inspection; no tuberculosis.	1; no; buried
Reach	None lately ...	Wells	No.....	3; kept in sanitary condition.
Ridout	Yes	Wells	No.....	1; offal buried
Rochester	No.....	.....	No; no	3; yes
Rolph, Buchan-an, etc.	No. ....	.....	No.....	None
Remuey.....	No.. .....	.....	No inspection; no tests.	2; not licensed; burnt; no.
Ryde	No.....	Wells	No; no.....	1; no license; cooked and fed to pigs.
Ryerson.....	Yes	Springs .....	.....	None
Sandfield	No	Wells	No	None.....
Sandwich, W ..	None .....	.....	.....	Three
Sandwich, E ...	No	Wells....	No	Seven
Sandwich, S....	No	Surface water and artesian wells.	No; no; no.....	Three; not licensed; offal fed to hogs; no.

TOWNSHIPS — *Continued.*

Is there systematic removal of garbage, and night soil? If so on what basis of cost is the removal made. How is cost calculated?	Is there a public sewerage system? If so what proportion of houses to whole is connected with public sewers.	State No. and kind of noxious trades. (See sec. 63 Public Health Act.) How licensed and regulated?	Have there been any prosecutions during year under Public Health Act? State in detail the nature of the case, and results of same.
.....	.....	None.....	No.
Each householder removes his own.	None needed	None.....	No.
.....	No.....	None.....	No.
In some cases.....	No.....	None.....	No.
No.....	No.....	None.....	No.
.....
Buried at cost of people interested.	No.....	None.....	No.
.....
No.....	No.....	None.....	No.
No.....	No.....	No.....	No.
No.....	No.....	No.....	No.
.....
No.....	No.....	None.....	No.
.....
.....	.....	None.....	No.
.....
Disposed of by owner of premises.	No.....	None.....	No.

TOWNSHIPS.—*Continued.*

Name of Municipality.	Names of Medical Health Officer and Sanitary Inspector.	Is there general sanitary inspection? Is it repeated at intervals every year? or is action taken only when complaint of nuisance is made to Board.	Contagious diseases.
Sarnia	T. G. Johnston, M.D. ....	.....	None
Sarawak	C. M. Lang, M.D.; W. C. Raven, Wm. Lee, S.I's.	.....	Typhoid, 6 cases....
Saugeen	— Veitch, M.D.; R. Smyth, A. McConnell, S.I.	Yes, of cheese factories and slaughterhouses.	Scarlatina, 2 cases
Sault Ste. Marie.	— Scheok, M.D. ....	.....	Typhoid, 1 case.....
Scott.....	None	Action taken when complaint is made.	Diphtheria, 2 cases.....
Scugog	— Clemens, M.D.	No.....	Typhoid, 1 case
Sebastopol	None	No.....	None
Sheffield	C. W. Day, Clarke, M.D.; S. M. Loyst, S.I.	Action taken only when complaint is made.	None.....
Sherbrook	N. Hopkins, M.D.	No	None.....
Smith	J. H. Fraser, M.D.; Geo. Westlake, S.I.	No; action taken when complaint is made.	Scarlatina, 23 cases; Diphtheria, 1 case.
Seneca	None	Members of Board inspect their respective districts.	None.....
Sombra	D. K. Stenton, M.D.....	Action taken when complaint is made.	Scarlatina, 4 cases; diphtheria, 1 case.
Somerville	R. S. Frost, M.D.....	.....	Diphtheria, 3 cases, 1 death
Sophiasburg....	J. Cregan, M. D.; Ira David, S.I.	When complaint is made to Board.	Diphtheria, 2 cases

TOWNSHIPS.—*Continued.*

Is isolation of contagious diseases systematically carried out? State methods adopted and whether any isolation hospital exists.	Is diphtheria anti-toxine in common use by physicians? Give results of treatment in all cases where possible.	Is disinfection after contagious diseases carried out under the personal supervision of an officer of the Board?	Does the Board make systematic inspection of the public schools? Does it require a certificate of vaccination from new school children each year?
.....
Isolated at home.....	No cases this year.....	Yes	Yes
As instructed by physician in attendance.	No cases	Yes	No
No	No.....	.....	.....
No	No.....	No	No.....
.....	.....	Yes; no.....	Yes; no.....
No	No	No	No
No occasion	No	No	No; no
No occasion	No occasion	No.....	No
Yes	No; principally from difficulty in securing fresh samples.	Yes	No; no
No occasion	Don't know	No cases	No; no
Yes	Not in common use	Yes	No
By placarding	Don't know.....	Yes	No; no
Yes	No.....	No	No

TOWNSHIPS.—*Continued.*

Name of Municipality.	Are forms for notification by teachers and M. H. O. of contagious diseases supplied? If not, will you explain the reason?	Give the source of water supply used on the premises. Also cause of typhoid fever cases.	Is there systematic inspection of dairy cows made during the year. Have cases of tuberculosis occurred, and state whether the tuberculin test has been used.	How many slaughter houses in municipality? Are they licensed on evidence of being kept in good sanitary condition? How is offal disposed of? Is there systematic inspection of carcasses by any officer of the Board?
Sarnia				
Sarawak	Yes	Springs and wells	No cases	One; inspected
Saugeen	Yes	Saugeen river, springs and wells.	No; no	Five; licensed; offal fed to hogs.
Sault Ste. Marie.		Wells	No; no	None
Scott	No	Wells	No	One; not licensed
Scuzog		Wells	No; no	None
Sebastopol ..	No	Spring or wells	No	None
Sheffield	No occasion	Wells	No; no	None
Sherbrook	No	Springs and lake water..	No	None
Smith	Yes	Wells	No; no; no	Three; no license; fed to hogs; no inspection of carcasses.
Seneca	Yes	Wells and springs	Don't know	None
Sombra	No	Springs	No; no	One; not licensed; deposited at a safe distance from dwelling.
Somerville	No	Wells	No	One
Sophiasburg	No	Wells	No	Two; no; no

TOWNSHIPS.—*Continued.*

Is there systematic removal of garbage and night soil? If so, on what basis of cost is the removal made? How is the cost calculated?	Is there a public sewerage system? If so, what proportion of houses to whole is connected with public sewers.	State No. and kinds of noxious trades. (See sec. 63 Public Health Act.) How licensed and regulated?	Have there been any prosecutions during year under Public Health Act? State in detail the nature of the case, and results of same.
No	No.....	None.....	No.
Removed by householder..	No.....	None.....	No.
No	No.....	None.....	No.
No	No	None.....	No.
.....	No.....	None.....	No.
No	No.....	None.....	No.
No	No.	None.....	No.
No	No.....	None.....	No.
No	No.....	None.....	No.
Householders attends to this.	No.....	None.	No.
No	No.....	None.....	No.
Householders removes them.	No.....	None.....	No.
No	No.....	None.....	No.

TOWNSHIPS.—*Continued.*

Name of Municipality.	Names of Medical Health Officer and Sanitary Inspector.	Is there general sanitary inspection? Is it repeated at intervals every year? or is action taken only when complaint of nuisance is made to Board.	Contagious diseases.
Southwold	Duncan Smith, M.D.	Yes	Typhoid, 1 case, 1 death
Stafford	None	No	Diphtheria, 1 case, 1 death
Stanhope, Sherbourn, etc....	Chas. D. Curry, M.D.	No; no; yes	Diphtheria, 13 cases, 3 deaths....
Stamford	John M. Dee, M.D.; Wm. A. Swain, S.I.	Yes; yes	None
Stanley	M. A. V. Armstrong, M.D.	No	Diphtheria, 1 case
Stephen	T. Wickett, M.D.; Wm. Lewis, S.I.	.....	Diphtheria, 15 cases, 5 deaths; typhoid, 12 cases, 2 deaths.
Stephenson	S. Bridgeland, M.D.	Upon complaint of nuisance.	Typhoid, 4 cases
Stisted	None	When complaint is made..	None
Strong	— Carmichael, M.D.; John Paget, S.I.	Only when deemed necessary.	None
Sullivan	R. H. Orton, M.D.; David Bond, S.I.	Action only taken when complaint is made.	Scarlatina, 8 cases, 2 deaths; typhoid, 6 cases, 1 death.
Sunnidale	Geo. Hunt, M.A.; Thos. Meacham, S.I.	No; action taken when complaint is made.	Scarlatina, 4 cases; typhoid 1 case.
Sydenham	A. C. Sloane, M.D.; Chas. McArthur, S.I.	Action taken when complaint is made.	Scarlatina, 2 cases; typhoid, 1 case.
St. Vincent .....	.....	.....	Three cases of infectious diseases.
Tecumseth	W. C. Law, M.D. ....	.....	None

TOWNSHIPS.—Continued.

Is isolation of contagious diseases systematically carried out? State methods adopted and whether any isolation hospital exists.	Is Diphtheria anti-toxine in common use by physicians? Give results of treatment in all cases where possible.	Is disinfection after contagious diseases carried out under the personal supervision of an officer of the Board?	Does the Board make systematic inspection of the public schools? Does it require a certificate of vaccination from new school children each year?
No	No occasion to use it this year.	Yes	Yes; no
No			No
No	No.....	Yes	No; no
No diseases; none			Yes; no.....
No	No.....	No	No
Partially	Yes	Yes	Yes
.....		Yes	No
No		Yes	No
Yes	No	Yes	No
Isolated in homes.....	Yes; no cases of late ...	Yes	Yes
Premises placarded and fumigated.	No	Yes	No.....
Yes	No.....	Yes	No; no
Yes		Yes	
No.....	No.....	Yes	No

TOWNSHIPS.—*Continued.*

Name of Municipality.	Are forms for notification by teachers and M. H. O. of contagious diseases, supplied? If not, will you explain the reason?	Give the source of water supply used on the premises. Also cause of typhoid fever cases.	Is there systematic inspection of dairy cows made during the year. Have cases of tuberculosis occurred, and state whether the tuberculin test has been used.	How many slaughter houses in municipality? Are they licensed on evidence of being kept in good sanitary condition? How is offal disposed of? Is there systematic inspection of carcasses by any officer of the Board.
Southwold		Wells	Yes	Six; none licensed; inspection monthly; offal fed to hogs.
Stafford	No			None
Stanhope, Sherbourn, etc....	No	Wells	No; no; no....	None
Stamford.....	Yes		Yes; none	Six; yes
Stanley	No		No	None.....
Stephen	Yes	Wells	No	Three
Stephenson.....	No	Wells	No	One
Stisted			No	None
Strong			No	None
Sullivan.....	Yes		No dairy cows	One; yes; buried; no.
Sunnidale	Yes	Wells	No; no license; no inspection.	One
Sydenham.....	Yes	Springs and wells.....	No.....	None.....
St. Vincent				
Tecumseth	No.....		No.....	Three

TOWNSHIPS.—Continued.

Is there systematic removal of garbage, and night soil? If so on what basis of cost is the removal made. How is cost calculated?	Is there a public sewerage system? If so what proportion of houses to whole is connected with public sewers.	State No. and kind of noxious trades. (See sec. 63 Public Health Act.) How licensed and regulated?	Have there been any prosecutions during year under Public Health Act? State in detail the nature of the case, and results of same.
.....	No.....	None.....	No.
No	No.	None	No.
No	No.....	None.....	No.
No	No.....	Seven; 1 bone boiling; 6 slaughterhouses.	No.
No	No.....	None.....	No.
No	No.....	None.....	No.
.....			No.
No	No.	None.....	No.
No	No.....	None.....	No.
.....		One tannery permitted if kept in sanitary condition.	No.
No.	No.....	One slaughterhouse	No.
No.....		None.....	No.
.....			
.....	No.....	None.....	No.

TOWNSHIPS.—*Continued.*

Name of Municipality.	Names of Medical Health Officer and Sanitary Inspector.	Is there general sanitary inspection? Is it repeated at intervals every year? or is action taken only when complaint of nuisance is made to Board.	Contagious diseases.
Tehkummah.....			Diphtheria, 5 cases
Thorah.....	A. Grant, M. D.; G. Wallace, S.I.		Diphtheria, 7 cases, 1 death
Tilbury, N	M. A. Lemire, M.D.; N. Thirbert.	When complaint is made to Board.	Typhoid, 5 cases, 2 deaths.....
Trafalgar	M. McCrimmon, M. D., R.A.		Typhoid, a few cases; diphtheria, 4 or 5 cases, 1 death.
Torbolton	G. H. Jones, M.D		Scarlet fever, a very large number of cases; diphtheria, 20 cases.
Toronto	— Sulton, M.D	When complaint is made..	Diphtheria, 32 cases, 4 deaths; typhoid, 1 case, 1 death.
Tossorontio	J. J. Williams, M.D.....		Typhoid, 10 cases, 2 deaths.....
Townsend	A. C. Duncomb, M.D	No; when complaint is made.	Typhoid, 2 cases.....
Turnbury	C. A. Toole, M.D	Action taken when complaint is made.	Diphtheria, 3 cases, 2 deaths
Tyendinaga	H. O. Lanfear, M.D.....	No; only when complaint is made.	.....
Usborne.....	— Ferguson, M.D	Action taken when complaint is made.	Scarlatina, 3 cases; diphtheria, 2 cases; typhoid, 12 cases.
Uxbridge.....	R. E. Darling, M. D.; James Howett, S.I.	On complaint to Board....	Diphtheria, 1 case
Vespra	Henry Wallwin, M. D.; David Garoin, S.I.	Yes; when complaint is made.	None reported.....
Watt	No M. H. O.; Henry W. Gill, S.I.		Diphtheria, 6 cases no deaths ...

TOWNSHIPS.—*Continued.*

Is isolation of contagious diseases systematically carried out? State methods adopted and whether any isolation hospital exists.	Is Diphtheria anti-toxine in common use by physicians? Give results of treatment in all cases where possible.	Is disinfection after contagious diseases carried out under the personal supervision of an officer of the Board?	Does the Board make systematic inspection of the public schools? Does it require a certificate of vaccination from new school children each year?
Yes		Yes	Yes
Yes	No.....	Yes	No ; no
Yes	No.	Yes	Yes ; yes
Yes		Yes	Yes
Yes	Used in 12 cases with excellent results.	Yes	Yes
Yes	Yes ; result favourable..	Yes	No.....
Yes		Yes	No ; no
No.....	No.....	No.....	No.....
Yes	Don't know	Yes	No ; no
Isolated in homes	Used in a few cases, results not good.	Not always	No ; no
Yes	In general use; apparently good results.	Physicians take precaution.	No ; no
Yes			No
Yes		No.	No ; no
Yes	No	Yes	Yes ; no.....

TOWNSHIPS.—Continued.

Name of Municipality.	Are forms for notifications by teachers and M. H. O. of contagious diseases supplied? If not, will you explain the reason?	Give the source of water supply used on the premises. Also cause of typhoid fever cases.	Is there systematic inspection of dairy cows made during the year? Have cases of tuberculosis occurred, and state whether the tuberculin test has been used.	How many slaughter houses in municipality? Are they licensed on evidence of being kept in good sanitary condition? How is offal disposed of? Is there systematic inspection of carcasses by any officer of the Board.
Tehkummah....	No .....	.....	No.....	None
Thorah.....	Yes .....	.....	No; no	One; yes; boiled; no..
Tilbury, N	Yes	Wells	No.....	One; yes; buried; yes.
Trafalgar .....	.....	.....	.....	.....
Torbolton .....	.....	.....	.....	.....
Toronto	Yes .....	.....	No.....	.....
Tossorontio ...	Yes	Springs and wells; by drinking surface water.	No; no	None
Townsend	No.....	Wells and springs	No; no	Five; no license
Turnbury	Yes	Wells	No.....	One or two.....
Tyendinaga ...	No.....	Wells	No.....	Don't know.....
Usborne	Yes	Wells	No; no	Four.....
Uxbridge	Yes	Wells	No sewerage system.	One; fed to hogs; no inspection.
Vespra	Yes	Wells	No	None.....
Watt	Yes	Wells	No; no	None.....

TOWNSHIPS.—Continued.

Is there systematic removal of garbage, and night soil? If so on what basis of cost is the removal made. How is cost calculated?	Is there a public sewerage system? If so what proportion of houses to whole is connected with public sewers.	State No. and kind of noxious trades. (See sec. 63 Public Health Act.) How licensed and regulated?	Have there been any prosecutions during year under Public Health Act? State in detail the nature of the case, and results of same.
.....	No	None.....	No.
No.	No.....	None.....	No.
Yes	No.....	None.....	No.
.....
.....
.....	.....	None.....	No.
No.....	No	None	No.
No.....	No.....	None	No.
No.....	No.....	None..	No.
No.....	Don't know	None.....	No.
No	No.	None.....	No.
.....	No.....	None.....	No.
No.....	No. . . .	None.....	No.
No	No.....	No.....	No.

TOWNSHIPS.—*Continued.*

Name of Municipality	Names of Medical Officer and Sanitary Inspector.	Is there general sanitary inspection? Is it repeated at intervals every year? or is action taken only when complaint of nuisance is made to Board?	Contagious diseases.
Waterloo	H. G. Roberts, M.D.; Owen Reist, S.I.	.....	Diphtheria, 2 cases, 1 death; typhoid, 2 cases, 2 deaths.
Wainfleet	W. B. Hopkins, M.D.	When complaint is made..	Scarlatina, 11 cases; diphtheria, 9 cases 1 death; typhoid, 9 cases, 1 death.
Wallsingham, S.	Geo. Stewart, M.D.; Henry Jerry, S.I.	Action taken when required.	None
Wallsingham, N.	J. M. Tweedle, M.D.; B. Robinson, S.I.	No	None
Wallace	L. W. Thompson, M.D.; Jno. Bristin, S.I.	Action taken when complaint is made.	None reported.....
Wawanosh, W.	T. E. Case, M.D.; Wm. McCrostie, S.I.	No regular inspection; when complaints are made they are attended to.	Scarlatina, 14 cases; diphtheria, 6 cases; typhoid, 1 case.
Wawanosh, E.	J. McAsh, M.D. ....	.....	Typhoid, 5 cases.....
Westminster .....	.....	Only when complaint is made.	.....
Whitby, E	None.....	Action taken when complaints are made.	.....
Whitby	John T. Moore, M.D.; Joseph Waring, S.I.	... ..	Typhoid, 10 cases, 2 deaths.....
Whitchurch	— Coulter, M.D.; — Frul, M.D.; G. H. Powell, S.I.	Action taken when complaint is made.	Diphtheria, 1 case; typhoid, 9 cases.
Widdifield	J. B. Carruthers, M.D.; Jas. Jassups, S.I.	Only where necessary.....	None
Wilmot	W. R. Nichols, M.D.; Jacob Wahl, S.I.	Yes; yes.....	Scarlatina, 2 cases, 1 death; diphtheria, 12 cases, 4 deaths; typhoid, 6 cases.
Willoughby	M. R. Collver, M.D.; Martin Burns, S.I.	.....	None

TOWNSHIPS.—Continued.

Is isolation of contagious diseases systematically carried out? State methods adopted and whether any isolation hospital exists?	Is diphtheria anti-toxine in common use by physicians? Give results of treatment in all cases where possible?	Is disinfection after contagious diseases carried out under the personal supervision of an officer of the Board?	Does the Board make systematic inspection of the public schools? Does it require a certificate of vaccination from new school children each year?
Yes	Not in general use.....	Yes	Yes; no
No: none: patients are isolated as much as possible.	Not used	Occasionally	No; no
No	No	No	No
No	No	No	No
Yes	Not generally used.....	Yes	No; no
.....	.....	Yes	No
Yes .....	.....	Yes .....	.....
.....
No	No	No	No
.....	No	No	Yes
Yes .....	.....	Not always.....	No.....
Yes	No	Yes	No
Yes	Yes; results very good ..	Yes	No; no
.....	.....	.....	No

TOWNSHIPS.—Continued.

Name of Municipality.	Are forms for notification by teachers and M. H. O. of contagious diseases supplied? If not, will you explain the reason?	Give the source of water supply used on the premises. Also cause of typhoid fever cases.	Is there systematic inspection of dairy cows made during the year? Have cases of tuberculosis occurred, and state whether the tuberculin test has been used.	How many slaughter houses in municipality? Are they licensed on evidence of being kept in good sanitary condition? How is offal disposed of? Is there systematic inspection of carcasses by any officer of the Board?
Waterloo.....	Yes	Wells	Yes; no; no	Fourteen; yes; fed to hogs.
Wainfleet	Yes	Wells and streams.....	No; none .....	.....
Wallsingham, S.	No	Wells	No	None.....
Wallsingham, N.	No .....	.....	No	One; yes; buried; no inspection.
Wallace	Yes	Wells	No; no	One; buried; no
Wawanosh, W.	Yes	Wells	No; yes; no	None.....
Wawanosh, E.	.....	.....	.....	.....
Westminster ..	.....	.....	.....	.....
Whitby, E.....	No .....	.....	No	Two; not licensed; not inspected.
Whitby	No	Wells	No	One; not licensed
Whitechurch ..	No	Wells	No	Four; no; fed to hogs.
Widdifield	No	Wells	No	Two; no; no
Wilmot	Yes, for M.H.O.	Wells	No; cases of tuberculosis have been detected after slaughtering and destroyed.	Four; no license; offal buried; yes.
Willoughby	No .....	.....	No	Two

TOWNSHIPS.—Continued.

Is there systematic removal of garbage, and night soil? If so on what basis of cost is the removal made. How is cost calculated?	Is there a public sewerage system? If so what proportion of houses to whole is connected with public sewers.	State No. and kind of noxious trades. (See sec. 63 Public Health Act.) How licensed and regulated?	Have there been any prosecutions during year under Public Health Act? State in detail the nature of the case, and results of same.
No	No.....	No.....	No.
No	No	No.....	No.
No	No.....	None.....	No.
No	No.....	None.....	No.
No	No.....	None	No.
No.....	No.....	None	No.
.....
.....
No	No.....	None	No.
No.....	No.....	None	No.
No.....	No.....	None	No.
No.....	No.....	None.....	No.
Burn garbage in spring and fall; night soil removed and buried.	No.....	None	No.
No.....	No.....	No.....	No.

TOWNSHIPS.—*Concluded.*

Name of Municipality.	Names of Medical Health Officer and Sanitary Inspector.	Is there general sanitary inspection? Is it repeated at intervals every year? or is action taken only when complaint of nuisance is made to Board.	Contagious diseases.
Wilberforce and North Algona.	None	Action taken when complaint is made.	Diphtheria, 2 cases; typhoid, 1 case.
Wollaston	— Fitzgerald, M.D	At intervals	None
Woolwich	W. W. Robinson, M.D....	When complaint is made..	Scarlatina, 1 case; diphtheria, 5 cases; typhoid, 20.
Yonge & Escott (Rear).....	J. G. Giles, M.D.; H. C. Phillips, S.I.	Excepting slaughterhouses; no action taken only when complaint is made.	None
Yonge & Escott (Front)	J. W. Lane, M. D.; F. Thompson, S.I.	Action taken when complaint is made.	None
York.....	T. J. Page, M.D.; C. V. Mitchell, S.I.	General inspection; report monthly.	Diphtheria, 19 cases, 3 deaths typhoid, 13 cases.
Zorra, E	A. N. Hotson, M.D.; Geo. Hotson, S.I.; Jas. D. McKay, S.I.	.....	Scarlatina, 4 cases; diphtheria, 1 case; typhoid, 27, 8 deaths.

TOWNSHIPS.—*Concluded.*

Is isolation of contagious diseases systematically carried out? State methods adopted and whether any isolation hospital exists.	Is diphtheria anti-toxine in common use by physicians? Give results of treatment in all cases where possible.	Is disinfection after contagious diseases carried out under the personal supervision of an officer of the Board?	Does the Board make systematic inspection of the public schools? Does it require a certificate of vaccination from new school children each year?
Yes; when cases occur.....	No	No	No; no
No	No	Yes	No; no
Yes; no hospital .....	.....	Yes	Yes
Yes, if necessary	No	Yes, if necessary	No; no
No	No .....	.....	No
Yes	Don't know	Yes	All schools inspected annually; no.
Not systematicaly; no hospital; premises placarded and isolation carried out; public funerals stopped lately.	Used occasionally with very good results.	Yes	Yes

TOWNSHIPS.—*Concluded.*

Name of Municipality.	Are forms for notification by teachers and M. H. O. of contagious diseases supplied? If not, will you explain the reason?	Give the source of water supply used on the premises. Also cause of typhoid fever cases.	Is there systematic inspection of dairy cows made during the year? Have cases of tuberculosis occurred, and state whether the tuberculin test has been used?	How many slaughter houses in municipality? Are they licensed on evidence of being kept in good sanitary condition? How is offal disposed of? Is there systematic inspection of carcasses by any officer of the Board?
Wilberforce and North Algoma.	No.....	Wells	No; no	None
Wollaston	No.....	.....	No.....	None
Woolwich	No.....	One school section had bad water causing diptheria.	A few cases; herds isolated and animals destroyed.	One
Yonge & Escott (Rear).....	No.....	.....	No; no	Two; under inspection.
Yonge & Escott (Front) .....	.....	Wells	No; no; no	None.....
York	No.....	M. H. O. reports that most cases are imported.	Inspected by city authorities; none.	Fifteen; yes; fed to hogs.
Zorra, E	Yes	Wells	No; some suspected cases; no tuberculosis test.	Four; licensed; offal fed to hogs, but Board is going to stop it unless cooked; no inspection of carcasses.

TOWNSHIPS.—*Concluded.*

Is there systematic removal of garbage and night soil? If so on what basis of cost is the removal made? How is the cost calculated?	Is there a public sewerage sys- tem? If so what proportion of houses to whole is connect- ed with public sewers?	State No. and kinds of noxious trades. (See sec. 63 Public Health Act.) How licensed and regulated?	Have there been any prosecu- tions during year under Pub- lic Health Act? State in detail the nature of the case, and results of same.
No.	No.	None	No.
No.	No.	None	No.
.....	.....	None	No.
No.	No.	None	No.
No.	No.	None	No.
.....	One rendering factory; one government pig- gery; By permit of council.	No.
No.	No.	None	No.





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